FACT SHEET FOR NPDES PERMIT WA0022900

BP CHERRY POINT REFINERY

February 14, 2012

PURPOSE of this Fact Sheet

This fact sheet explains and documents the decisions Ecology made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for BP Cherry Point Refinery.

The Environmental Protection Agency (EPA) developed the NPDES permitting program as a tool to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." EPA delegated to Ecology the power and duty to write, issue, and enforce NPDES permits within Washington State. Both state and federal laws require any industrial facility to obtain a permit before discharging treated process water to a water body.

An NPDES permit limits the types and amounts of pollutants the facility may discharge. Those limits are based either on (1) the pollution control or wastewater treatment technology available to the industry, or on (2) the receiving water's customary beneficial uses. This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit *and accompanying fact sheet* for public evaluation before issuing an NPDES permit.

PUBLIC ROLE in the Permit

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit to the facility operator (WAC 173-220-050). Copies of the fact sheet and draft permit for BP Cherry Point Refinery, NPDES permit **WA 0022900,** are available for public review and comment from April 13, 2011 until the close of business June 13, 2011. For more details on preparing and filing comments about these documents, please see **Appendix A - Public Involvement**.

Before publishing the draft NPDES permit, BP Cherry Point Refinery reviewed it for factual accuracy. Ecology corrected any errors or omissions about the facility's location, product type or production rate, discharges or receiving water, or its history.

After the public comment period closes, Ecology will summarize substantive comments and our responses to them. Ecology will include our summary and responses to comments to this Fact Sheet as **Appendix O - Response to Comments**, and publish it when issuing the final NPDES permit. Ecology will not revise the rest of the fact sheet, but the full document will become part of the legal history contained in the facility's permit file.

Liem Nguyen prepared the permit and this fact sheet.

SUMMARY

The BP Cherry Point Refinery operates a wastewater treatment plant that discharges to the Strait of Georgia. Ecology issued the previous permit for this facility on October 1, 1999.

The proposed permit retains the effluent limits for the conventional pollutants Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), Oil and Grease (O&G), phenols, ammonia, and sulfide from the previous permit issued in 1999. New limits are proposed for hexavalent chromium.

Ecology added new limits at the biological treatment system to ensure that flow and BOD loading do not exceed approved facility design criteria. The proposed permit retains the monitoring frequencies from the previous permit for BOD5, TSS, O&G, sulfide, and phenol, reduces the monitoring frequencies for COD and ammonia, and adds monitoring for fecal coliform.

The proposed permit adds annual monitoring for priority pollutants, a herring toxicity study, and groundwater monitoring.

TABLE OF CONTENTS

I. INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the State of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington). Ecology adopted rules describing how it exercises its authority:

- Procedures Ecology follows for issuing NPDES permits (Chapter 173-220 WAC),
- Water quality criteria for surface waters and ground waters (Chapters 173-201A and Chapter 173-200 WAC),
- Sediment management standards (Chapter 173-204 WAC), and
- Submission of Plans and Reports for Construction of Wastewater Facilities (Chapter 173-240 WAC)

These rules require any industrial facility operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and an accompanying fact sheet, and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where can read the draft permit, and where to send their comments during a period of least thirty days (WAC 173-220-050). (See **Appendix A--Public Involvement** for more detail on the Public Notice and Comment procedures). After the public comment period ends, Ecology may make changes to draft NPDES in response to comments. Ecology will summarize the response to comments and any changes to the permit in **Appendix O**.

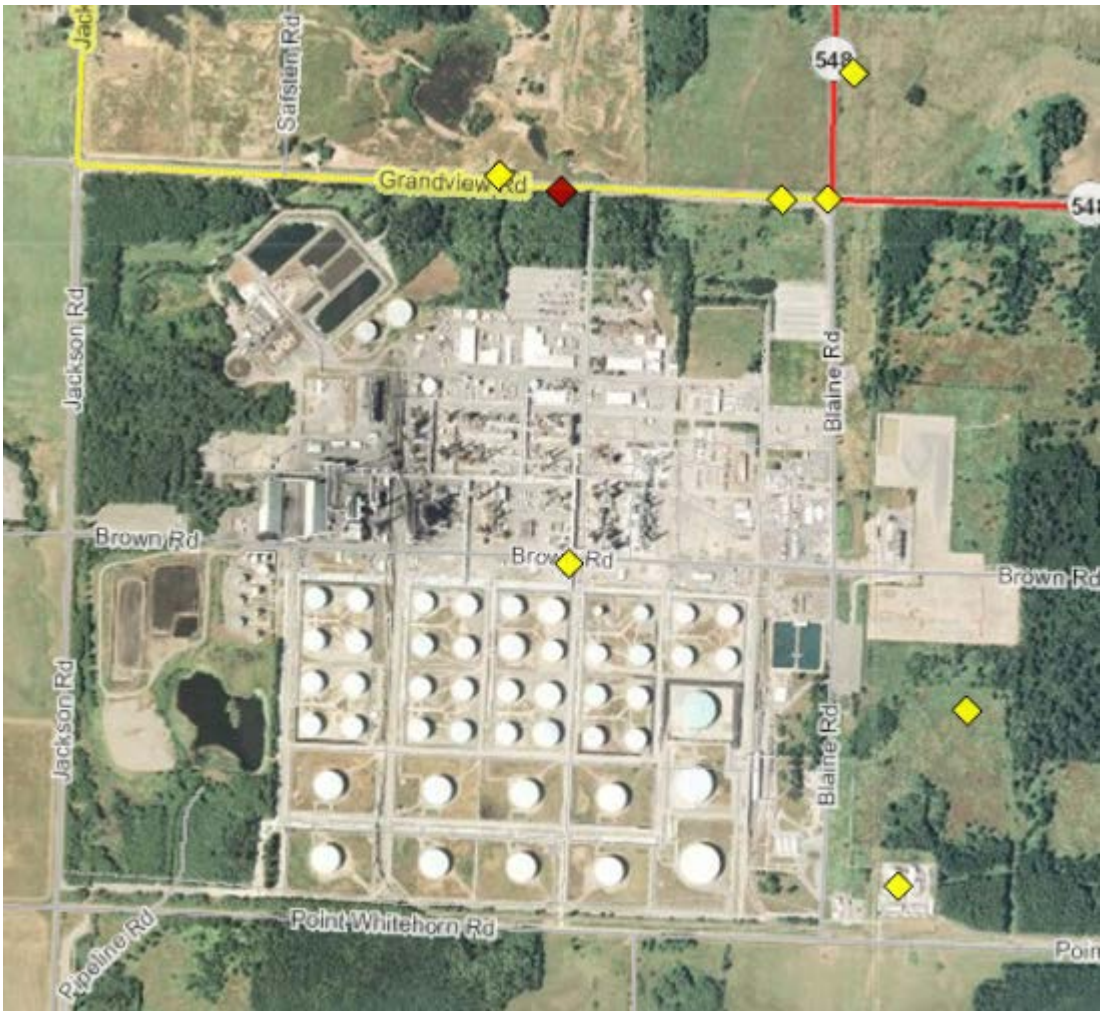
II. BACKGROUND INFORMATION

Table 1. General Facility Information

Applicant:	BP Cherry Point Refinery	
Facility Name and Address:	BP Cherry Point Refinery 4519 Grandview Road Blaine, Washington 98230	
Type of Facility:	Petroleum Refinery	
SIC Code:	2911	
Discharge Location:	Water Body Name: Strait of Georgia	
	Latitude	Longitude
Outfall 001	48.860833	122.757222
Outfall 006	48.866111	122.752222
Discharge Location:	Water Body Name: Terrell Creek	
Outfall 002	48.859167	122.731944
Outfall 003	48.8925	122.743056
Outfall 004	48.8925	122.747778
Outfall 005	48.8825	122.747778
Outfall 007	48.891944	122.726389

A. Facility Description

Figure 1. Facility Location Map



SITE DESCRIPTION AND HISTORY

The BP Cherry Point Refinery is located in a rural area of Whatcom County, approximately six miles northwest of Ferndale, Washington. The refinery encompasses an area of about 740 acres, bordered by Grandview Road to the north, Point Whitehorn Road on the south, and Jackson Road to the west. BP's property extends eastward to the railroad spur west of the Chemco facility. Prior to construction of the refinery in 1971, the site was used as agricultural land. The refinery employs approximately 800 people.

INDUSTRIAL PROCESS

In 1979, the refinery processed an average of 106,000 barrels (bbls) per day of crude oil. The refinery processed an average of 209,000 bbls per day of crude oil over a 24-month period from October 2008 to October 2010. The main source of crude oil has historically been from tankers delivering oil from Alaska's North Slope, however, crude oils from other sources are also processed.

The refinery separates crude oil into various components for further processing and blending into a variety of petroleum products. These products include gasoline, jet fuel, diesel fuel, liquid petroleum gas, and residual fuel oil. The refinery also has a coke calciner operation; coke is a product used in the aluminum smelting industry. The refinery processes use an average of 7 million gallons of water per day (MGD). Additionally, another 30,000 gallons per day are used for potable water purposes. The Public Utility District #1 of Whatcom County supplies raw water and Birch Bay Water and Sewer District supplies potable water. Major process water uses include cooling tower water make-up (3.8 MGD), boiler feed water (2.6 MGD), and utility services (0.72 MGD).

WASTEWATER TREATMENT

BP's wastewater treatment plant treats various wastewaters including process water, ballast water from tankers, tank water draws, and stormwater that falls in process areas of the site. The refinery treats its process water with primary and secondary treatment in a wastewater treatment system consisting of four parallel API oil/water separators, two induced gas floatation units, an equalization tank, a complete mix activated sludge unit, a secondary clarifier, and two clarification ponds. BP further treats the sludges generated in the activated sludge units by sludge thickening in aerated sludge holding tank followed by dewatering with a belt filter press, and disposal in the on-site non-hazardous waste landfarm located in the southwest corner of the refinery property. A flow diagram of the wastewater treatment system is shown in **Appendix C**.

The refinery's stormwater sewer system collects stormwater falling on industrial areas of the refinery, other than the areas within the process unit boundaries. This stormwater receives primary treatment before being discharged through Outfall 001. Any oil present on the water surface as it enters the observation channel of the stormwater pond is skimmed off by a rotating surface skimmer at the head of the channel and is routed to the API separators. Solids settle out in the stormwater pond, and stormwater flows to the final holding pond where it commingles with the treated process water before discharge.

The refinery's oily water sewer system collects stormwater falling within the process unit boundaries for treatment, along with process wastewater, at the refinery's wastewater treatment plant.

In the event that final effluent does not meet specifications, the refinery can divert the final effluent to the emergency wastewater impoundment until it returns it to the wastewater treatment system for additional treatment.

Sanitary wastewater from the refinery is discharged to the Birch Bay Water and Sewer District for treatment.

The draft permit authorizes BP to receive untreated wastewater from the Praxair, Inc. Ferndale facility and the proposed BP Cogeneration facility and treat it in the refinery's wastewater treatment system. More details on these waste streams are provided below.

Praxair Inc. is a carbon dioxide (CO_2) manufacturing plant. This plant was built in 1978 and is located next to the BP Cherry Point Refinery. Praxair's treated process water is discharged through BP's Outfall 001 at an average flow rate of 50,000 gallons per day (gpd). The wastewater mainly consists of cooling tower blowdown, a small volume of cooling water sand filter back-wash, stormwater from the scale sump pit, process condensate, and wastewater from

plant floor drains. Praxair has an NPDES Permit, No. WA0030350, issued on June 28, 2002. Ecology's Northwest Regional Office sent the permit renewal for public notice on July 10, 2008 and issued the final permit on October 28, 2011.

In 2007, BP notified Ecology that they planned to accept several wastewater streams from Praxair for treatment in the refinery's wastewater treatment system. These wastestreams include cooling tower blowdown, wash tower water, cooling water sand filter backwash, stormwater from the scale sump pit, process condensate, and plant floor drain waters. Praxair's NPDES permit includes monitoring requirements and pretreatment limits for these wastestreams prior to their discharge to BP. Ecology reviewed the information provided by BP and determined that the wastewater treatment facility had the capacity to treat the additional Praxair wastewater.

The proposed BP Cogeneration Facility includes a 480 MW combined-cycle (steam and electricity) cogeneration facility consisting of two (2) natural gas-fired combustion turbines (CGTs), each driving one electric generator. The power plant will employ an evaporative cooling system using water from the Whatcom County Public Utility District No. 1 (PUD). The PUD owns the water rights for water in this area. Both Alcoa and the BP refinery contract for the water through the PUD. The PUD withdraws water from the Nooksack River. The refinery currently uses approximately 7 MGD of PUD supplied water.

BP, Intalco, and the PUD entered into a "No Use" Agreement. Under this agreement, BP will provide funding for Intalco to install a compressor cooling system on the Intalco site. The compressor will eliminate approximately 3.6 million gallons of water per day currently used by the smelter for once-through cooling. Once the project is complete, Intalco will release its contractural right to the water. BP will enter into an agreement with the PUD to use this water for the cogeneration project.

The cogeneration facility is expected to produce non-recyclable process wastewater which will be sent to the BP refinery's wastewater treatment system. This non-recyclable process wastewater is a combination of filtered raw water backwash solids and dissolved solids from the circulating water in the cooling water lines. Other wastewater streams that could be produced and introduced into the process wastewater include equipment water leaks and wash down waters, water from the compressor wash system, process area stormwater, water from containment areas, and other wastewaters as identified in the discharge permit and site certificate for the cogeneration facility.

The cogeneration facility will collect process wastewater in a sump before discharge to the refinery to prevent an upset to the refinery's wastewater treatment system. The refinery will treat the cogeneration facility's wastewater along with its process wastewater.

The cogeneration facility will route stormwater that has the potential to collect process chemicals and lube oils to the process wastewater system. The facility will be capable of checking stormwater with a very low potential for contamination prior to discharge (such as secondary containment around electrical breakers) to the stormwater system. Initiation of the project is currently pending.

SOLID WASTES

The BP refinery manages various solid wastes onsite including: garbage, recyclables, (paper, plastic, glass, metal, and wood) biosolids, clay tower media, non-hazardous vessel sludge, off-spec coke, non-hazardous excavated soil, concrete, and refractory.

DISCHARGE OUTFALLS

BP Cherry Point Refinery has one process wastewater outfall (001) and six industrial stormwater outfalls (002, 003, 004, 005, 006, and 007). The discharge from each outfall is described below.

Process Wastewater Outfall 001

The refinery treats process water, ballast water, and stormwater and discharges it via a 20-inch diameter multi-port submerged diffuser at **Outfall 001**. The diffuser is located under the south pier, 2200 feet offshore at a depth of 57 feet below mean lower low water.

The refinery pumps treated effluent into the Strait of Georgia on a continual basis. Since October 1999, the monthly average of effluent discharge generally ranged between 2.8 to 6.4 MGD. During heavy rainfall events the flow can reach levels as high as 10.5 MGD, as occurred in September of 2010.

Stormwater Outfalls 002-007

Outfall 002 drains approximately 108 acres of refinery property including construction equipment laydown yards, contractor areas, salvage yard, paint and sandblast area, and warehouse. The drainage area for Outfall 002 contains the largest percentage of areas of industrial activity (as compared to the other stormwater outfalls). Discharge from Outfall 002 flows north under Grandview Road and eventually to Terrell Creek.

Outfall 003 drains 37 acres of refinery property, primarily the area along the northern portion of the refinery. Outfall 003 could discharge wastewater in the unlikely event of an overflow of the Final Holding Pond or an alternative discharge of water held in the Storm Water Pond. Drainage from the outfall flows west along Grandview Road before flowing under Jackson Road and eventually to Terrell Creek. Only 4% of Outfall 003's drainage area is an area of industrial activity.

Outfall 004 drains 62 acres of refinery property, primarily the northwest portion of the property. It includes the butane sphere area, the contractor equipment storage area, and the calciner area. Drainage from the outfall flows north along Jackson Road before flowing west under Jackson Road, at its intersection with Grandview Road, and eventually to Terrell Creek. Only 17% of Outfall 004's drainage area is an area of industrial activity.

Outfall 005 drains 177 acres in the southwest corner of the refinery property, which includes an area below the pipelines running between the refinery and dock facilities along Jackson Road, as well as a tank dike area near the dock facilities. In addition, stormwater from the east and west of the refinery's property drains to Outfall 005. The discharge from Outfall 005 flows under Jackson Road to the northwest and eventually to Terrell Creek. Only 1% of Outfall 005's drainage area is an area of industrial activity.

Outfall 006 drains 7 acres of refinery property near the dock facilities. Stormwater discharging to Outfall 006 is normally captured in an on-shore sump and pumped back to the refinery's

wastewater treatment system. During heavy rainfall events, the refinery may bypass the initial on-shore sump and send the stormwater directly to Outfall 006, rather than run the risk of overflowing the on-shore sump. Discharges associated with Outfall 006 discharge directly to the Strait of Georgia.

Outfall 007 drains 267 acres of the eastern undeveloped and unsewered areas of the refinery east of Blaine Road. The construction of an equipment/material laydown area has re-characterized a portion of the drainage's stormwater discharge from this outfall as an area of industrial activity. Stormwater runoff from the laydown area is captured in the stormwater detention pond located in the northwest corner of the laydown area prior to discharge. Discharge from Outfall 007 flows to the north under Grandview Road and eventually to Terrell Creek. Only 8% of Outfall 007's drainage area is an area of industrial activity.

See **Attachment C** in the permit renewal application for more detail of all the above outfalls.

DISCHARGE LOCATIONS

The process wastewater outfall line (001) is located under a pier that extends approximately 2,200 feet offshore. The outfall discharges through a diffuser into about 57 feet of water. Table 1 (see above) identifies the approximate locations of Outfalls 001, 002, 003, 004, 005, 006, and 007.

B. Permit Status

BP submitted an application for permit renewal to Ecology on May 03, 2004. Due to the dry weather at the time, the refinery was unable to collect stormwater samples to characterize the stormwater discharging from Outfalls 002, 003, 004, and 005. Ecology authorized an extension for submitting Form 2F until December 2004. BP submitted Form 2F on December 14, 2004. Ecology determined that the permit renewal application was complete and accepted it on January 3, 2005. BP submitted an update to the permit renewal application on July 10, 2010.

Ecology issued the previous permit for this facility on October 1, 1999 and modified it on February 1, 2001, May 7, 2001, and September 7, 2001. The previous permit placed effluent limits on BOD, COD, TSS, oil and grease, phenols, ammonia, sulfide, chromium, fecal coliform, and pH.

Ecology based the limits for Outfall 001 in the previous permit on two feedstock rates or tiers. The permit established effluent limits for Tier 0 and Tier 1 scenarios. Tier 0 was included in the permit in response to the failure of the Olympic Pipeline. BP Cherry Point Refinery was limited in the amount of crude oil that it could process as a result of the pipeline being unavailable to transport refined products. From January 2001 to November 2004, the feedstock rate averaged 194,730 bbls per day. The feedstock average exceeded the Tier 0 limits in 2001. Upon achieving this rate, the discharge from Outfall 001 became subject to the Tier 1 limits. The following table summarizes the Monthly Average and Daily Maximum limits for Tier 0 and Tier 1.

Table 2. Previous Tier 0 and Tier 1 Permit Limits

OUTFALL-001		TIER 0 (170,000 bbls/day)		TIER 1 (205,000 bbls/day)	
PARAMETERS	**Units**	**Monthly Average**	**Daily Maximum**	**Monthly Average**	**Daily Maximum**
Biochemical Oxygen Demand (5-day)	lbs/day	1151	2098	1240	2260
Chemical Oxygen Demand	lbs/day	7959	15461	8540	16610
Total Suspended Solids	lbs/day	923	1457	990	1570
Oil and Grease	lbs/day	338	629	360	680
Phenolic Compounds	lbs/day	7.5	15.5	8.1	16.7
Ammonia as N	lbs/day	784	1724	870	1910
Sulfide	lbs/day	6.2	13.7	6.7	14.7
Total Chromium	lbs/day	11.1	25.2	12.5	27.5
Hexavalent Chromium	lbs/day	0.8	1.8	0.9	2
Fecal Coliform	Colonies/100mls				
pH		Within the range of 6.0 to 9.0			

In March 2002, BP began discharging its domestic wastewater to the Birch Bay Wastewater Treatment Plant and was no longer subject to the effluent limits for domestic wastewater discharge included in the previous permit. Prior to March 2002, the effluent limitations for the domestic wastewater discharge were as shown in the table below.

Table 3. Previous Permit Limits for the Domestic Wastewater Discharge

SANI-PAK		Concentration Limit	
PARAMETERS	**Units**	**Monthly Average**	**Weekly Average/ Daily Maximum**
Biochemical Oxygen Demand (5-day) - Effluent	lbs/day	30	45
Total Suspended Solids - Effluent	lbs/day	30	45
Fecal Coliform	Colonies/100ml	200	400
Residual Chlorine	mg/l	--	0.35

C. Summary of Compliance with Previous Permit Issued

Ecology conducts two Class 1 and one Class 2 compliance inspections annually at BP. Since the permit was issued in 2001, Ecology has conducted a total of **twenty** Class 1 and **ten** Class 2 inspections at the refinery. A Class 1 is a walk-through inspection to visually check the wastewater treatment system and stormwater outfalls, including stormwater BMPs. A Class 2 is a combination of a Class 1, reviewing records of the laboratory, and taking samples at Outfall 001 and at the industrial stormwater outfalls. Ecology conducted the last Class 2 inspection on May 9-10, 2011 and found the facility in compliance with the permit at the time of inspection.

During the term of the previous permit, the refinery remained in compliance except for **one exceedance,** according to Discharge Monitoring Reports (DMRs) submitted to Ecology (see **Appendix D**) and based upon the results of inspections conducted by Ecology. On August 8, 2008, BP discharged 1655 lbs of TSS which is 85 lbs (5%) over the daily maximum limit. On October 17, 2008, Ecology issued BP a penalty of $1000 for the violation. This exceedance was related to seasonal algal growth in the final holding pond. The refinery has since covered the final holding pond to minimize light penetration and discourage algal growth in the summer months.

D. Review of Previous Permit Requirements

The previous permit required BP to conduct the following studies and submit reports during the permit cycle. Ecology used the data from these reports to prepare this proposed permit.

1. Stormwater Monitoring Results:

   See the results discussed later in this document.

2. Spill Reporting and Notification System (SRNS):

   BP submitted the SRNS on February 2, 2000. The SRNS fulfills the requirement in the current permit.

3. Treatment Efficiency Study Plan and Engineering Report:

   BP submitted this report on June 4, 2002. Ecology approved the report on January 6, 2006 and determined it met the requirement in the previous permit. See the results discussed later in this document.

4. Sediment study:

   The refinery submitted this report in 2001. See results discussed later in this document.

5. Dioxin Study Report:

   The refinery submitted the Dioxin Study Report to Ecology on July 9, 2001. The previous permit required BP to sample the chlorinated dioxins and furans (2,3,7,8-Cl substituted tetra-through octa-congeners) concentrations as follows:

   - In the wastewater stream from each of the catalytic reformer regenerations (4 sampling events)
   - In the final effluent most likely to contain wastewater generated during the catalytic reformer regeneration events sampled for dioxins (2 sampling events)
   - In the API separator sludge generated during the catalytic reformer regeneration events sampled for dioxins (2 sampling events)

   The sampling results indicated that the most toxic compound of the chlorinated dioxin/furan congeners (2,3,7,8 TCDD) was detected in one sample of the wastewater

stream from Catalytic Reformer #2. The refinery measured a concentration of 0.028 ng/l; just above the practical reporting limit of 0.010 ng/l. It did not detect any dioxin or furans in the effluent. The proposed permit requires BP to monitor the chlorinated dioxin and furan (2,3,7,8-Cl substituted tetra-through octa-congeners) concentrations at the final effluent of Outfall 001 and the upstream wastewater from the catalytic reformer units twice during the next permit cycle.

6. Treatment System Operating Plan (TSOP):

The refinery submitted an updated TSOP to Ecology on May 4, 2004. The TSOP met the requirements in the previous permit.

7. WET Testing Reports:

The results are described later in this document.

8. Report on Impacts from Isomerization Unit:

BP Cherry Point Refinery submitted a report informing Ecology of the potential impacts to the refinery's wastewater effluent resulting from the construction of the proposed Isomerization (Isom) Unit. BP submitted an amended NPDES permit application Form 2C seeking permission to accept and treat the wastewaters generated from the Isom Unit under its current NPDES permit. The report and amended application were dated December 22, 2003.

Construction of the Isom Unit allows BP Cherry Point Refinery to produce gasoline that meets all current and pending gasoline quality regulations. The isomerization process requires a very dry state to produce a low sulfur, high octane, and low benzene gasoline component.

Ecology reviewed the above report and the amended Form 2C and determined the existing BP Cherry Point WWTP had capacity to treat the additional flow from the Isom Unit. Ecology authorized BP to treat the wastewater from the Isom Unit without modifying the existing permit on January 26, 2004. BP began operation of the Isom Unit in July 2004.

The Isom Unit contributes an increased flow to the refinery's wastewater treatment plant (WWTP) of approximately 23 gallons per minute (gpm) which is less than 1% of the current WWTP effluent flow rate of approximately 2500 gpm. The wastewater stream generated by this unit is similar to other wastewater streams generated throughout the refinery. The wastewater commingles with other process wastewater and is treated and discharged in accordance to the BP Cherry Point NPDES Permit.

9. Impacts from the Diesel Hydro Desulfurization Unit (DHDS):

BP Cherry Point Refinery submitted a report informing Ecology of the potential impacts to the refinery's wastewater effluent resulting from the construction of the proposed DHDS Unit also known as the Ultra Low Sulfur Diesel (ULSD) project. BP submitted

the report and an amended NPDES permit application Form 2C, dated May 27, 2005, seeking permission to accept and treat the wastewaters generated from the DHDS Unit under its current NPDES permit.

Ecology reviewed the above report and the amended Form 2C and determined the existing BP Cherry Point WWTP had capacity to treat the additional flow from the DHDS. Ecology authorized BP to treat the wastewater from the DHDS Unit without modifying the existing permit in June 2005.

The ULSD project is designed to minimize cooling water, steam usage, and sour water production. The DHDS Unit contributes an increased flow to the refinery's WWTP of approximately 35 gpm which is less than 2% of the current WWTP effluent flow rate of approximately 2500 gpm. The wastewater stream generated by this unit is similar to other wastewater streams generated throughout the refinery. The wastewater generated from this unit commingles with other process wastewater and is treated and discharged in accordance with the BP Cherry Point NPDES Permit.

10. Impacts from the Proposed BP Cogeneration Facility Discharge:

BP Alternative Energy will own and operate the proposed BP Cogeneration Facility. The cogeneration facility will discharge the wastewater to the BP Cherry Point Refinery wastewater treatment system. As part of the permitting process for the proposed BP Cogeneration Facility, BP prepared a conservative analysis of the cogeneration process wastewater pollutant and flow characteristics to evaluate potential impacts on the existing refinery discharge to the Strait of Georgia. This analysis included a review of the refinery wastewater treatment design capacity and projected changes to the amount of capacity available at the time that the cogeneration facility begins operation.

BP evaluated changes to organic and hydraulic loading to the refinery's wastewater treatment system, the addition of other new process wastewater streams, and the addition of the cogeneration process wastewater. The refinery used the treatment efficiencies and other information it collected in the refinery treatment system efficiency study in this evaluation. BP reported that with these projected increases in loading, it will use approximately 50% of the organic and 60% of the hydraulic capacity of the wastewater treatment system.

Ecology reviewed this analysis and determined that this project will not adversely affect the refinery's wastewater treatment system and the cogeneration's process wastewater will not cause the refinery to exceed any of the refinery's NPDES permit limits.

The BP Cogeneration Facility's application included the projected metal concentrations in the blended cogeneration wastewater stream to be discharged to the refinery. BP compared the metal concentrations in the cogeneration process wastewater to state water quality standards at different stages: prior to combining with refinery process wastewater, when mixed with refinery process wastewater influent, and following treatment of the combined flows. The refinery applied removal percentages calculated from data collected in the refinery treatment system efficiency study to the metal concentrations to determine approximate removal through the refinery wastewater treatment system.

Dilution factors authorized in the refinery's NPDES permit were also applied. Ecology determined that the metal concentrations in the combined discharge were well within acute and chronic marine water quality standards.

The cogeneration facility's discharge to the refinery's wastewater treatment system will be covered by the NPDES permit No. EFSEC 2002-01 and apply AKART to the discharge of pollutants into the process wastewater.

After beginning commercial operation of the BP cogeneration facility, the facility will prepare an initial characterization of its process wastewater as required by its discharge permit. Ecology requires regular process wastewater monitoring to ensure that over time there are no significant changes in the characteristics of the discharge (quality and quantity) than from what was predicted.

E. Wastewater Characterization

BP characterized the proposed wastewater discharges in the permit application process for: conventional pollutants, metals, cyanide, volatile organic compounds, acid compounds, base neutral compounds, and pesticides. The long term average values reported below for Outfalls 001 are based on extensive (daily to weekly) monitoring completed during the term of the current permit.

The values in Table 4 are for pollutants with significant concentrations and/or of interest and metals and organics that were quantified at greater than detection limits. This information is from the updated BP's NPDES permit renewal application dated July 30, 2010 and represents the quality of the effluent discharged from January 2009 through December 2009.

Table 4. Wastewater Characterization for Outfall 001 (Long Term Averages except where noted)

Parameter	Concentration (mg/l)	Mass (lb/day)
BOD	5.1	207
COD	74	2844
TSS	14	541
Ammonia as N	1.9	81
Flow	4.69 MGD	
Temperature	Winter 18.4 ºC	Summer 24.4 ºC Maximum 27.3 ºC
pH	Minimum 6.8 SU	Maximum 8.7 SU
Oil & Grease	1.4	51
Sulfide	0.02	0.8

Parameter	Concentration (mg/l)	Mass (lb/day)
Phenols (Total)	0.06	2.3
Parameter	**Concentration (μg/l)**	**Mass (lb/day)**
Arsenic (Total)	15	0.593
Copper (Total)	3.75	0.157
Chromium (Total)	4.5	0.174
Nickel (Total)	40.5	1.49
Selenium (Total)	66.5	2.7
Zinc (Total)	18	0.741
Cyanide (Total)	<5	Below Measurable Quantity

F. Description of the Receiving Water

BP discharges to **the Strait of Georgia,** which is designated as an extraordinary marine receiving water in the vicinity of Outfall 001. Characteristic uses include the following: fish migration, rearing, and spawning; clam, oyster, and mussel rearing, spawning, and harvesting; crustaceans and other shellfish (crabs, shrimp, scallops, etc.) rearing, spawning, and harvesting; wildlife habitat; primary contact recreation; sport fishing; commerce and navigation; boating; and aesthetic enjoyment. Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

Other nearby point-source outfalls include ConocoPhillips Refinery, Intalco Aluminum Smelter, and Birch Bay POTW. Significant nearby non-point sources of pollutants include stormwater runoff and groundwater seeps/discharges from contaminated sites, in particular the abandoned Treoil Industries site.

The closest Ecology long-term core monitoring station, GRG002, is located in the Strait of Georgia near Patos Island. It is far enough away from the Cherry Point industries to prevent their discharges from influencing readings taken there. There is also substantial data for this station. The station at Bellingham Bay, BLL009, is also very close but is influenced by activity in Bellingham and is not suitable for a background data station. The closest long-term rotating station is LOP001 in Lopez Sound.

The table below includes the ambient background for 90th percentile temperature calculated from January 1999 through June 2005 at Station GRG002 and the metal concentrations taken from the *Background Metals Concentrations in Selected Puget Sound Marine Receiving Waters* prepared by Eric Crecelius, Battelle Marine Sciences Laboratory, February 1998.

Table 5. Ambient Background Data

Parameter	Value Used
Temperature (90th percentile)	11.8 °C
Ammonia	16 ug/L
Aluminum	45.2 ug/L
Cadmium	0.059 ug/L
Copper	0.673 ug/L
Lead	0.146 ug/L
Mercury	0.001 ug/L
Zinc	3.9 ug/L

G. Cherry Point Aquatic Reserve

BP discharges to the Strait of Georgia which is part of the Cherry Point Aquatic Reserve. In 2000, the Washington State Department of Natural Resources (DNR) designated the Cherry Point area as an environmental aquatic reserve. DNR developed the Cherry Point Aquatic Reserve Management Plan to guide future management decisions for the reserve. The plan includes actions related to: protection, enhancement and restoration, outreach and education, monitoring, data collection and research, and allowed and prohibited uses within the reserve.

A number of the management actions in the Cherry Point Aquatic Reserve Management Plan are addressed in the proposed permit, including conditions to ensure ongoing compliance with water quality standards, sediment monitoring, and herring toxicity testing.

H. SEPA Compliance

Regulation exempts reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than state rules and regulations. The exemption applies only to existing discharges, not to new discharges.

III. PROPOSED PERMIT CONDITIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).

- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the State of Washington. Ecology does not develop effluent limits for all reported pollutants**.** Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop permit limits for pollutants that were not reported in the permit application but that may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the five-year permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology, as described in 40 CFR 122.42(a), if significant changes occur in any constituent. Industries may be in violation of their permit until Ecology modifies the permit to reflect additional discharge of pollutants.

A. Design Criteria

Under WAC 173-220-150(1)(g), neither flows nor waste loadings may exceed approved design criteria. Ecology approved the following design criteria for the refinery's wastewater treatment plant. These criteria were obtained from BP's engineering report dated June 04, 2002 and updated permit renewal application dated July 30, 2010.

Table 6. Design Criteria for BP's Biological Wastewater Treatment System

Parameter	Design Quantity
Daily Maximum Flow from the Secondary Clarifier	13 MGD
Daily Maximum BOD_5 Influent Loading to Aeration Tank	25,160 lbs/day

B. Technology-Based Effluent Limits

PROCESS WASTEWATER

Ecology based the effluent limits for the BP refinery on Best Conventional Pollutant Control Technology (BCT), Best Available Technology Economically Achievable (BAT), Best Practicable Control Technology Currently Available (BPT), and New Source Performance Standards (NSPS) developed by the Environmental Protection Agency (EPA). Guidelines were published August 12, 1985 under 40 CFR Part 419 by the Environmental Protection Agency (EPA) for the cracking subcategory of petroleum refining.

The refinery effluent limitations are based on terms of a settlement agreement dated April 17, 1984, between EPA and the Natural Resources Defense Council resolving litigation about the EPA guidelines. The August 12, 1985 guidelines establish Best Available Technology (BAT) and Best Conventional Technology (BCT) as equal to Best Practicable Technology (BPT) for all

parameters except phenols and chromium. Phenols and chromium are regulated by whichever guideline is more stringent.

In 1996, EPA completed a study of the petroleum refining industry (EPA-821-R-96-015) including treatment technologies, pollutants discharged, pollutant loadings, and potential water quality impacts. Based upon this review, EPA decided not to revise the refinery effluent guidelines. EPA determined that the best treatment technology currently available was essentially the same as that applied at the time the effluent guidelines were originally promulgated. EPA also determined that if the wastewater treatment systems at the refineries are properly operated and maintained, priority pollutants will be removed or treated to negligible or below detectable levels.

In addition, Ecology requires facilities to use all known, available, and reasonable methods to control toxicants (AKART) in its wastewater as required under Washington State regulations. Because Ecology applies new source performance standards (NSPS) on the basis of the AKART requirements, the refinery's NPDES permit limits are more stringent than those in other states. Ecology has applied the more stringent NSPS limits to all crude throughput increases since 1984.

On December 31, 2003, EPA published its intention to review the petroleum refining industry again to decide the necessity for revising their effluent guidelines. EPA evaluated pollution prevention opportunities, emerging treatment technologies, revising the effluent guidelines, and expanding the list of regulated pollutants. EPA reviewed information and comments on several issues including: control technologies for polycyclic aromatic hydrocarbons (PAHs), dioxin sources and reduction/control technologies, sources of toxic metals, process modifications to reduce metals, and what toxics are being released and remain unreported.

On September 2, 2004 (Federal Register Volume 69 No. 170), EPA published its decision regarding revising the refinery effluent guidelines. EPA concluded that there is little evidence that PAHs are present in refinery wastewater discharges in concentrations above the detection limit. They also concluded that the concentration of metals being discharged by refineries is at or very near treatable levels, leaving little to no opportunity to reduce metals discharges through conventional end-of-pipe treatment.

EPA reviewed the available dioxin information collected by refineries nationwide much of which was collected at the Washington state refineries. The overall data indicated that dioxins are only occasionally discharged in relatively low concentrations in treated refinery effluent. In its opinion, this data did not warrant the development of national categorical limitations on dioxin in refinery wastewater discharges. EPA did note that on a case-by-case, best professional judgment basis, permit writers may decide to include effluent limitations for dioxin.

EPA also encouraged permit writers and refineries to consider pollution prevention opportunities. As a result of their evaluation, EPA concluded that there was no need to revise the federal effluent guidelines at this time.

Ecology must decide whether the effluent guidelines also constitute all known, available and reasonable methods of treatment (AKART). As a general rule, if the effluent guidelines for a particular category are 5 years old or less, they are considered to be AKART. This will be immediately apparent in reviewing the development document. The development document

describes production processes, pollutants generated, treatment efficiencies, and unit process designs present nationwide in the specific industry at the time of effluent guideline development.

Generally, when effluent guidelines are over 10 years old, Ecology will analyze unit process designs and efficiencies to determine that the effluent guidelines constitute AKART and meet the intent of RCW 90.48.520. The previous NPDES permit required BP to prepare a treatment efficiency study and an engineering report describing the treatment capacity of the wastewater facility.

Ecology compared BP's production processes, pollutants generated, and treatment technology to EPA's original development document and the results of EPA's 1996 and 2004 evaluations of the petroleum refining industry. Ecology also examined the treatability data base and BP's wastewater treatment design and efficiencies. Ecology determined that BP is providing AKART for its wastewater.

Since Ecology issued the previous NPDES permit (October 1, 1999), BP's crude oil throughput rate has changed. The feedstock rate increased slightly during the permit term. The daily average throughput rate ranged from 78,341 to 234,051 bbls/day. The rate changes in refinery processes are shown in the table below, along with the applicable size and process factors selected from the EPA guidelines. The size and process factor determination is documented in **Appendix E**. Ecology multiplied these factors by the actual feed stock to obtain an adjusted feed stock that is used in determining effluent limits, except for determining BAT limits for phenols and chromium. **Table 7** shows production rates and factors for a feedstock rate of 209,000 bbls/day.

Table 7. Refinery Process Throughput

Production Rates and Factors	1979 Permit	1990 Permit	1999 Permit	2011 Permit
Actual Feed Stock, bbls/day	106,000	172,200*	205,000	209,000
Desalting, bbls /day	106,000	172,200	205,000	209,000
Atmospheric Distillation, bbls/day	106,000	172,200	205,000	209,000
Vacuum Distillation, bbls/day	55,000	89,400	115,100	139,000
Hydrocracking, bbls/day	35,000	47,600	53,510	55,000
Coking, bbls/day	29,000	51,300	55,710	59,600
Catalytic Reforming, bbls/day**	29,000			
Hydrotreating, bbls/day**	13,000			
Process Factor	1.09	1.09	1.00	1.00
Size Factor	1.23	1.41	1.41	1.41
Adjusted Feed Stock, bbls/day	142,114	265,000	289,050	294,690
New Source Performance Standards Increment, bbls/day		122,990	146,940	152,576

* All feed stock rates specified in this permit represent actual crude throughput less recycled oil and other recycled material.

** Baseline values for these processes are used to calculate BAT limitations for phenols and chromium.

Increases in the feed stock rate are subject to limitations that Ecology determined to be the treatment level obtained from using all known available and reasonable treatment methods. The increases are subject to New Source Performance Standards (NSPS) on the basis of AKART. Ecology calculated the NSPS limitations by multiplying the increase in adjusted feed stock, (294,690 - 142,114 = 152,576 bbls per day) by New Source Performance Standards. It added the resulting NSPS increment, based upon 152,576 bbls per day, to the BAT and BPT limitations, based upon the adjusted baseline feedstock rate of 142,114 bbls per day. Ecology did not include BCT limitations because they are equivalent to BPT limitations.

Table 8 compares the calculated effluent limits with the limits from the previous permit issued on October 1, 1999. BP has stated that they are willing to accept the limits from the previous permit calculated for a crude throughput rate of 205,000 bbls/day. The proposed permit includes the 1999 limits for all parameters with the exception of new limits for hexavalent chromium and a correction to the monthly average limit for phenols.

Table 8. Comparison of Effluent Limits

	Units	Basis of Limit	Previous 1999 Effluent Limits: Outfall 001 at 205,000 bbls/day		Calculated Effluent Limits: Outfall 001 at 209,000 bbls/day	
Parameter			**Average Monthly**	**Maximum Daily**	**Average Monthly**	**Maximum Daily**
Biochemical Oxygen Demand (5-day)	lbs/day	BPT	1240	2260	1260	2290
Chemical Oxygen Demand	lbs/day	BPT	8540	16610	8660	16850
Total Suspended Solids	lbs/day	BPT	990	1570	1010	1590
Oil and Grease	lbs/day	BPT	360	680	370	690
Oil and Grease	mg/l		The concentration of oil and grease in the discharge must at no time exceed 15 mg/l and must not exceed 10 mg/l more than three days per month.			
Phenolic Compounds	lbs/day	BPT & BAT	8.1	16.7	7.6	16.9
Ammonia as N	lbs/day	BPT	870	1910	880	1950
Sulfide	lbs/day	BPT	6.7	14.7	6.7	14.9
Total Chromium	lbs/day	BAT	12.5	27.5	--	--
Hexavalent Chromium	lbs/day	BAT	0.9	2	--	0.050 mg/l and 2.1 lbs/day
pH			In the range of 6.0 to 9.0			

The Environmental Protection Agency determined federal effluent guidelines for total and hexavalent chromium back when chromium was commonly used in cooling water systems and discharged at much higher levels in the effluent. Chromium was banned for use in cooling systems by EPA in the early 1990s and the only remaining source of chromium is in the crude oil. Because federal effluent guidelines still include limits for chromium, Ecology must include an effluent limit for chromium in the proposed permit to ensure that refineries in Washington are subject to the same requirements as refineries located in other states.

Ecology believes the guideline-derived effluent limit is artificially high now that chromium in the effluent has decreased to levels bordering on non-detectable. All detectable samples of chromium in the BP effluent have been within the range of 5 to 11 µg/l which is less than $1/10^{th}$ of the marine chronic water quality standard of 50 µg/l for hexavalent chromium (acute standard = 1100 µg/l). Approximately half of the samples collected during the last 5 years have been non-detectable for chromium.

Based on this information, Ecology's **Best Professional Judgment** is that a **50 µg/l hexavalent chromium concentration limit** is technologically achievable, reasonable, and protective of the receiving water quality. The proposed permit condition imposes the 50 µg/l as a technology-based limit and not as a water quality-based limit.

At a 3.87 MGD effluent flow (dry weather), the 50 µg/l limit converts to 1.61 lbs/day. This limit is more stringent than the federal effluent guideline BAT limit of 2.1 lbs/day. At lower effluent flows, this limit will continue to be more stringent than the federal effluent guideline limit. However, at higher effluent flows, the federal effluent guideline limit will be more stringent. Therefore, the proposed permit includes both a concentration limit of 50 µg/l and a mass-based limit of 2.0 lbs/day to cover all flow situations that might occur. (The 2.0 lbs/day is the mass-based limit retained from the current permit.)

The technology-based hexavalent chromium limit replaces the total chromium limits and the hexavalent chromium limits in previous permits.

If chromium levels change in the crude oil refined at BP and result in concentration increases, Ecology will modify the permit to increase the limit as needed to allow continued facility compliance. Ecology will evaluate any revised limit to ensure that the effluent continues to meet water quality standards within the authorized mixing zone and the anti backsliding requirements are met and to ensure that chromium concentrations do not exceed limits allowed under the federal effluent guidelines. In the event that the federal effluent guidelines are promulgated without chromium limits, Ecology will drop the limit from the permit unless the situation changes and a water quality limit is necessary. BP will continue to perform semi-annual hexavalent chromium monitoring.

The permit limit calculations are tabulated in **Appendix E**. The actual permit limit is based on the NSPS increment and the more stringent of the BAT and BPT determinations. BAT limitations are more stringent than BPT for phenol and chromium. The proposed effluent limitations are listed in the **Table 9** below.

Table 9. Proposed Effluent Limits

PARAMETER	Units	Monthly Average	Daily Maximum
Biochemical Oxygen Demand (5-day)	lbs/day	1260	2290
Chemical Oxygen Demand	lbs/day	8660	16850
Total Suspended Solids	lbs/day	1010	1590
Oil and Grease	lbs/day	370	690
Oil and Grease	mg/l	The concentration of oil and grease in the discharge shall at no time exceed 15 mg/l and shall not exceed 10 mg/l more than three days per month.	
Phenolic Compounds	lbs/day	7.6	16.9
Ammonia as N	lbs/day	880	1950
Sulfide	lbs/day	6.7	14.9
Hexavalent Chromium	lbs/day	--	0.050 mg/l and 2.1lbs/day
pH	In the range of 6.0 – 9.0		

BALLAST AND STORMWATER ALLOCATIONS

Contaminated stormwater from the process area and the wastewater treatment facility is collected by the oily water sewer system and conveyed to the wastewater treatment facility for treatment. Stormwater from the tank farms and the rest of the industrial site is diverted into the stormwater system. The effluent from the stormwater system is discharged into the stormwater observation channel adjacent to the stormwater pond at the wastewater treatment plant. Any oil or grease on the surface is removed by a skimmer that discharges to the oily water sewer. The water then cascades into the stormwater pond, where settling occurs. The stormwater pond discharges from an outlet box located near the floor of the pond into the final holding pond along with treated process wastewater effluent.

Vessel personnel measure ballast water volumes. The refinery pumps ballast water from the dock facilities to a tank in the wastewater treatment plant for treatment. The volume of ballast water is very small compared to process water and stormwater. BP refinery has not received ballast water since February 2001. Stormwater volume is not directly measured at the facility. Direct measurement of total stormwater is not possible since a portion of the stormwater is diverted into the oily water sewer and mixed with process wastewater at many collection points throughout the process area. A portion of the stormwater is collected in the stormwater system. The refinery calculates stormwater flow during storm events by subtracting an estimated dry weather flow from the total flow discharged each day.

Ecology performed the dry weather flow calculation in **Appendix F** by completing a linear regression on the average monthly flow versus the total monthly rainfall using data collected during years 2005-2010. It determined the new dry weather flow rate of 3.87 MGD by averaging the y-intercepts of linear regression for years 2009 and 2010 because those years had the strongest correlation between average monthly flow and rainfall.

The ballast and stormwater allocations in the permit are based on guidelines in 40 CFR 419.12(c) and 419.22(e). The proposed permit does not include a stormwater allocation for chromium as provided for in the federal effluent guidelines. The allocations for stormwater were developed to apply to runoff from areas associated with industrial activity. During the months of June through October, BP may only claim the stormwater allocation when it can demonstrate that measurable rainfall has occurred at the refinery site during the previous **10** calendar days. Ecology chose ten days because when big storms hit it takes approximately that amount of time to discharge accumulated stormwater. BP retains stormwater within the tank dikes during rain events to the extent possible and slowly discharges stormwater into the stormwater system following rain events to maximize the settling that occurs through the stormwater system. Should the on-site means of measuring rainfall be unavailable due to equipment malfunction, BP may use rainfall data from other nearby industries or the National Weather Service station at Blaine.

Table 10. Stormwater and Ballast Water Allocations

Parameter	Stormwater Allocation (lbs/million gallons)		Ballast Water Allocation (lbs/million gallons)	
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum
Biochemical Oxygen Demand (5-day)	220	400	210	400
Chemical Oxygen Demand	1500	3000	2000	3900
Total Suspended Solids	180	280	170	260
Oil and Grease	67	130	67	126

BP claimed the stormwater allocation for TSS 42 times during the last permit cycle. **Appendix G** shows the monitoring periods when BP claimed the stormwater allocation for TSS.

STORMWATER DISCHARGE MONITORING (OUTFALLS 002, 003, 004, 005, AND 007)

Stormwater monitoring data for Outfalls 002 and 003 collected during the previous permit term are tabulated in **Appendix H**. The data indicate that the stormwater runoff from the areas drained by the two outfalls is similar in composition to non-industrial runoff in the area. During years 2000 thru 2002, the results were lower than Ecology and EPA stormwater benchmarks. Therefore, Ecology allowed BP to reduce the stormwater monitoring frequency from semi-annually to annually on March 12, 2003, per permit condition S1.E.a.

The proposed permit expands the parameters to be monitored at Outfalls 002 and 003. In addition, there is a new source of stormwater to Outfall 002 from construction activities for the Clean Fuels Project. Because of these changes, the proposed permit increases the frequency of monitoring at Oufalls 002 and 003. The permit requires BP to monitor Outfalls 002 and 003 quarterly for turbidity, TSS, oil and grease, pH, total copper, total zinc, and hardness at Outfalls 002 and 003 to be consistent with the Industrial General Stormwater Permit.

BP has not previously monitored stormwater Outfalls 004 and 005 except to do a baseline characterization for NPDES permit application purposes. Outfall 007 is currently permitted under the Industrial Stormwater General Permit. These outfalls drain areas that have very little exposure to industrial activities or materials. The proposed permit requires the refinery to monitor Outfalls 002, 003, 004, 005, and 007 quarterly for turbidity, TSS, oil and grease, pH, total copper, total zinc, and hardness. BP may petition Ecology to reduce the sampling frequency for one or more parameters based upon a consistent attainment of benchmark values. Consistent attainment is defined as eight consecutive quarters of monitoring.

Benchmark values are not water quality standards or permit limits. They are indicator values. Values at or below the benchmark are considered unlikely to cause a water quality violation. The proposed permit includes standard language regarding general prohibitions and requiring actions to respond to monitoring results above benchmark values for these outfalls. There are no limits established for discharges from these outfalls in the proposed permit.

ALTERNATIVE STORMWATER DISCHARGE

On-shore Sump

Under normal operating conditions, BP collects stormwater from the southern hillside above the dock pipe run in a basin. From the collection basin, stormwater flows into an on-shore sump, which also collects oily wastewater from the dock facilities. BP pumps the commingled stormwater and wastewaters from the dock's onshore sump to the refinery's wastewater treatment plant. During heavy rainfall events, the proposed permit authorizes BP to discharge stormwater directly to the Strait of Georgia from the collection basin via Outfall 006 rather than running the risk of overflowing the dock's onshore sump. In the event of a stormwater discharge via Outfall 006, the refinery must monitor the following parameters: turbidity, TSS, O&G, pH, and estimated flow and report the monitoring results with the monthly discharge monitoring report.

Discharge of Outfall 003

The proposed permit authorizes the refinery to discharge water from the stormwater holding pond through Outfall 003 during heavy rainfall events. The use of Outfall 003 allows the refinery to pump the water from the stormwater holding pond to avoid overflowing the final holding pond, which contains treated process wastewater. In the event of discharge, the refinery must monitor the following parameters: turbidity, TSS, O&G, pH, and estimated flow and report the monitoring results with the monthly discharge monitoring report.

FINAL EFFLUENT DISCHARGE FOR FIREWATER TESTING

The proposed permit authorizes BP to use treated final effluent for monthly firewater testing supply and during Emergency Response Team (ERT) training. It does not authorize the use of foam during the firewater testing or ERT training.

CONSTRUCTION PROJECT STORMWATER DISCHARGE REQUIREMENTS

The table below includes a list of projects at the refinery and the Industrial and Construction Stormwater General permits issued by Ecology since 2004. When Ecology issues the proposed NPDES permit, it will replace the Industrial Stormwater General Permit for Outfall 007. BP must submit a notice of termination for its coverage under the Industrial Stormwater General Permit as per Condition S13. of that permit.

BP will need to apply for coverage under the Construction Stormwater General Permit for future construction projects that disturb one or more acres and discharge to surface waters of the state. Discharges from construction activities will not be covered by the proposed NPDES permit.

Table 11. Permit Status

Permit Type	Permit No.	Issued Date	Terminated Date
Industrial Stormwater General Permit - for *stormwater Outfall 007*	SO3-007537 / WAR007537	7/3/2006	Still in effect
Construction Stormwater General Permit - for *the construction of roundabout at SR-548 Grandview Road and Blaine Road Intersection*	WAR012598	6/30/2010	12/09/2010
Construction Stormwater General Permit - for *the Non Process Facility Siting Project*	WAR010680	6/17/2008	11/12/2010
Construction Stormwater General Permit - for *the Cogeneration/Facilities Wetlands*	WAR011683	6/1/2009	10/28/2010
Construction Stormwater General Permit - for *the East Refinery Utility Infrastructure Project*	WAR009118	8/2/2007	8/22/2008
Construction Stormwater General Permit - for *the Ultra Low Sulfur Diesel Project*	SO3-006168 / WAR006168	5/2/2005	6/2/2006
Construction Stormwater General Permit - for *the Brown Road Material Storage Area*	SO3-005451 / WAR005451	12/2/2003	9/12/2008
Construction Stormwater General Permit - for *the Isomerization Unit*	SO3-005178	3/21/2003	5/27/2004

C. Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) were designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet established surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life

Numerical water quality criteria are published in the Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numerical criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

Numerical Criteria for the Protection of Human Health

The U.S. EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (40 CFR 131.36). These criteria are designed to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The Water Quality Standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200, 2006) and of all marine waters (WAC 173-201A-210, 2006) in the State of Washington.

Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment (AKART).
- Apply three Tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria

assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology may not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in Chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the water quality standards.
- Whenever the natural conditions of a water body are of a lower quality than the assigned criteria, the natural conditions constitute the water quality criteria. Where water quality criteria are not met because of natural conditions, human actions are not allowed to further lower the water quality, except where explicitly allowed in this Chapter.

This section of the fact sheet describes Ecology's analysis. The analysis demonstrates that the existing and designated uses of the receiving water will be protected under the conditions of the proposed permit.

Ecology has reviewed existing water quality data from Ecology's long-term monitoring station GRG002 and from Eric Crecelius (1998). The data show that the ambient water meets the temperature, dissolved oxygen, pH, turbidity, ammonia, cyanide and metals standards for marine waters extraordinary quality category given in Chapter 173-201A WAC. Therefore, Ecology uses the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

MIXING ZONES

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones, the pollutant concentrations may exceed water quality numeric criteria, so long as the diluted wastewater doesn't interfere with designated uses of the receiving water body (e.g., recreation, water supply, and aquatic life and wildlife habitat, etc.). The pollutant concentrations outside of mixing zones must meet water quality numeric criteria.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The State's Water Quality Standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge; and use no more than 25% of the available width of the water body for dilution. Ecology uses modeling to estimate the amount of mixing within the mixing zone and determine the potential for violating the water quality standards at the edge of the mixing zone and derive any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur (see Ecology's Permit Writer's Manual). Each critical condition parameter (by itself) has a low probability of occurrence and the resulting dilution factor is conservative. The term "reasonable worst-case" applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water comprises 90% of the total volume at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life **acute** criterion is based on the assumption that organisms are not exposed to that concentration for more than one-hour and more often than one exposure in three years. Each aquatic life **chronic** criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two liters/day for drinking water
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400; 2006). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

1. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone.

2. The facility must fully apply AKART to its discharge.

Ecology has determined that the treatment provided for the discharge at Outfall 001 and the pollution prevention activities practiced at BP meet the requirements of AKART (see "Technology based Limits").

3. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body's critical condition, (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated water body uses). The critical discharge condition is often pollutant-specific or water body-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology uses the water depth at mean lower low water (MLLW) for marine waters.

Ecology's Permit Writer's Manual describes additional guidance on criteria/design conditions for determining dilution factors. The Manual can be obtained from Ecology's website at: http://www.ecy.wa.gov/biblio/92109.html.

Ecology used the following critical conditions to model the discharge:

- Water depth at MLLW of 57 feet.
- Density profile with a difference of 9.29 sigma-t units between 57 feet and the surface.
- 50^{th} percentile current speeds of 0.15 m/sec for chronic and human health mixing zones.
- 10^{th} or 90^{th} percentile current speeds of 0.04 m/sec for acute mixing zone.
- Maximum average monthly effluent flow of 4.4 MGD for chronic and human health non-carcinogen.
- Annual average flow of 4.0 MGD for human health carcinogen.
- Maximum daily flow of 8.4 million gallons per day (MGD) for acute mixing zone.
- 1 DAD MAX Effluent temperature of 28.4 degrees C.

Ambient data at critical conditions in the vicinity of the outfall was taken from the "Mixing Zone Analysis of BP's Outfall" prepared by ENSR Corporation in May 2008.

4. Supporting information must clearly indicate the mixing zone would not:

- **Have a reasonable potential to cause the loss of sensitive or important habitat,**
- **Substantially interfere with the existing or characteristic uses,**
- **Result in damage to the ecosystem, or**
- **Adversely affect public health.**

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms, and set the criteria to protect all aquatic species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for 1-hour. They set chronic criteria assuming organisms are exposed to the pollutant at the criteria concentration for 4 days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of being discharged.

The dilution modeling under critical conditions shows that the acute dilution at Outfall 001 is attained in less than 3 minutes and the chronic dilution in less than 6 minutes.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the discharge at Outfall 001 will not exceed 33 degrees C for more than 2 seconds after discharge and that the temperature of the receiving water after mixing with the discharge will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing. WET testing performed by BP for Outfall 001 indicates that there is no reasonable potential for acute or chronic receiving water toxicity.

The mixing zone for Outfall 001 is small and is centered at a distance of 2,200 feet from shore. The mixing zone does not lie near the herring spawning areas, which are closer to shore.

There is no documented linkage between BP's discharge at Outfall 001 and the reduction in the local herring population. BP will use the recently developed herring bioassay tests to evaluate the possible effects of their effluent on herring and to compare the herring bioassay results with other EPA approved bioassay tests.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics, and the discharge location. Based on this review Ecology concluded that the discharge at Outfall 001 does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem or adversely affect public health.

5. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant (see **Appendix I**). Ecology concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

Modeling studies by ENSR in 2001 also evaluated the aggregate impact of the different industrial discharges in Cherry Point area. It was concluded from the studies that the combined discharges do not result in exceedance of water quality criteria.

6. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. Because tidal currents change direction, the plume orientation within the mixing zone changes. The plume rises through the water column as it mixes therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed the discharge and the receiving water is more completely mixed in a shorter time period. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95^{th} percentile pollutant concentration, the 90^{th} percentile background concentration, the centerline dilution factor and the lowest flow occurring once in every 10 years to perform the reasonable potential analysis.

The facility continues to conduct pollution prevention activities and has completed pollution prevention projects. These activities also minimize the concentrations of pollutants in the discharge.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

7. Maximum size of mixing zone.

The authorized mixing zone for the discharge at Outfall 001 does not exceed the maximum size restriction.

8. Acute Mixing Zone -

- **The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.**

  Ecology determined that the acute criteria will be met at 10% of the distance (257 ft) of the chronic mixing zone.

- **The pollutant concentration, duration and frequency of exposure to the discharge, will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.**

  As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

  Dilution modeling has demonstrated that mixing in the acute zone occurs very rapidly as the less dense effluent rises through the water column due to both the diffuser design and the buoyance of the effluent. Acute mixing occurs in less than 3 minutes for Outfall 001. The duration and frequency of exposure to elevated concentrations by any drifting or non-strong swimming organisms is minimized because the organisms simply cannot stay in one place while the plume moves past them. Because the mixing zone poses no barrier to organisms, strong swimming species are able to avoid the plume. Exposure to elevated concentrations in the effluent by benthic organisms is avoided because the plum rises in the water column.

  The acute mixing zone is sized at 10% of the distance of the chronic mixing zone.

- **Comply with size restrictions.**

  The mixing zone authorized for the discharge at Outfall 001 complies with the size restrictions published in Chapter 173-201A WAC.

9. Overlap of Mixing Zones.

The mixing zone for the discharge at Outfall 001 does not overlap another mixing zone.

D. Designated Uses and Surface Water Quality Criteria

Applicable designated uses and surface water quality criteria are defined in Chapter 173-201A WAC. In addition, the U.S. EPA set human health criteria for toxic pollutants (40 CFR 131.36). Criteria applicable to this facility's discharge are summarized below.

Aquatic life uses are designated using the following general categories. All indigenous fish and non-fish aquatic species must be protected in waters of the state.

(a) **Extraordinary quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

(b) **Excellent quality** salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

(c) **Good quality** salmonid migration and rearing; other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning.

(d) **Fair quality** salmonid and other fish migration.

The aquatic life uses for this receiving water are identified below:

Table 12. Aquatic Life Uses & Associated Criteria

Extraordinary quality	
Temperature Criteria – Highest 1D MAX	13°C (55.4°F)
Dissolved Oxygen Criteria – Lowest 1 Day Minimum	7.0 mg/L
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
pH Criteria	pH must be within the range of 7.0 to 8.5 with a human-caused variation within the above range of less than 0.2 units.

To protect **shellfish harvesting**, fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, and not have more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies/100 mL.

The **miscellaneous marine water uses** are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

E. Evaluation of Surface Water Quality -Based Effluent Limits for Numeric Criteria

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred.

Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

Pollutant concentrations in the proposed discharge exceed water quality criteria despite using technology-based controls which Ecology determined fulfills AKART. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones described in chapter 173-201A WAC.

The diffuser at Outfall 001 is 52 feet long with a diameter of 20 inches. The diffuser has total 13 ports, seven ports on one side and six ports on the other side. Each port has a 3-inch diameter. The distance between the ports is 4 feet. The mean lower low water (MLLW) depth at the diffuser is 57 feet. This information is available in the Mixing Zone Analysis of BP's Outfall conducted by ENSR Corporation submitted to Ecology in May 2008.

Chronic Mixing Zone

WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 300 feet plus the depth of water over the discharge ports as measured during MLLW.

The horizontal distance of the chronic mixing zone is 257 feet. The mixing zone extends from the seabed to the top of the water surface.

Acute Mixing Zone

WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone for Outfall 001 extends 26 feet in any spatial direction from any discharge port.

BP determined the dilution factors of effluent to receiving water that occur within these zones by the use of a dye study and modeling. The results of the dye study and initial modeling of the mixing zones at BP is documented in the 1990 Dilution Ratio Study Report. Additional modeling is presented in the report entitled "Effluent Plumes Modeling Study" and "Mixing Zone Analysis of BP's Outfall" prepared by ENSR Consulting and Engineering in August 2001 and May 2008, respectively.

Ecology selected the most conservative density profile and ambient current velocity specified in the 2008 ENSR Mixing Zone Analysis to calculate the dilution factors at Outfall 001. **Appendix J** shows the input parameters and dilution factors. Ecology decided to retain the acute dilution factor for Outfall 001 from the previous permit per WAC 173-201A-400, which requires that the size of mixing zone be minimized, as follows:

Table 13. Dilution Factors (DF)

	Acute	Chronic
Aquatic Life	28	110
Human Health, Carcinogen	N/A	136
Human Health, Non-carcinogen	N/A	136

Ecology determined the impacts of immediate oxygen deficiency, temperature, pH, fecal coliform, chlorine, ammonia, metals, nutrients, and other toxics as described below, using the

dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

BOD_5

Ecology predicted no violation of the surface water quality standards for dissolved oxygen (DO) under critical conditions. Therefore, Ecology placed the technology-based effluent limit for BOD_5 in the permit.

Temperature

The state temperature standards (WAC 173-201A-200-210 and -600-612) include multiple elements:

- Annual summer maximum threshold criteria (June 15 to September 15)
- Supplemental spawning and rearing season criteria (September 15 to June15)
- Incremental warming restrictions
- Protections against acute effects

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

- **Annual summer maximum and supplementary spawning/rearing criteria**

  Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), 210(1)(c), and Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

  Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

  The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for marine waters and some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

- **Incremental warming criteria**

  The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii), 210(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

  At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined

increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

At locations and times when a threshold criterion is being exceeded due to natural conditions, all human sources, considered cumulatively, must not warm the water more than 0.3°C above the naturally warm condition.

When Ecology has not yet completed a TMDL, our policy allows each point source to warm water at the edge of the chronic mixing zone by 0.3°C. This is true regardless of the background temperature and even if doing so would cause the temperature at the edge of a standard mixing zone to exceed the numeric threshold criteria. Allowing a 0.3°C warming for each point source is reasonable and protective where the dilution factor is based on 25% or less of the critical flow. This is because the fully mixed effect on temperature will only be a fraction of the 0.3°C cumulative allowance (0.075°C or less) for all human sources combined.

- **Temperature Acute Effects**

  Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C; unless a dilution analysis indicates ambient temperatures will not exceed 33°C 2-seconds after discharge.

  General lethality and migration blockage: Measurable (0.3°C) increases in temperature at the edge of a chronic mixing zone are not allowed when the receiving water temperature exceeds either a 1DMax of 23°C or a 7DADMax of 22°C.
  Lethality to incubating fish: Human actions must not cause a measurable (0.3°C) warming above 17.5°C at locations where eggs are incubating.

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, the supplementary spawning criterion, and the incremental warming criteria (see temperature calculation in **Appendix K**).

The discharge is only allowed to warm the water by a defined increment when the background (ambient) temperature is cooler or warmer than the assigned threshold criterion. Ecology allows warming increments only when they do not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

The incremental increase for this discharge is within the allowable amount. Therefore, the proposed permit does not include a temperature limit.

The permit requires additional monitoring of effluent temperature. Ecology will reevaluate the reasonable potential during the next permit renewal.

General lethality and migration blockage: The receiving water conditions are listed in Section II.F. of the fact sheet. The Strait of Georgia does not exceed a 1DMax of 23°C.

pH

Compliance with the technology-based limits of 6.0 to 9.0 will assure compliance with the water quality standards of surface waters because of the high buffering capacity of marine water.

Fecal Coliform

Ecology's 2006 Class 2 inspection showed high fecal coliform value in the final effluent. BP suspected that the high fecal coliform was due to increased wildlife activitiy at the ponds in the tertiary treatment system. BP sent a sample of effluent to a molecular lab to confirm that the fecal coliform was not from human origins. There was no human gene biomarker detected in the sample.

The proposed permit includes a study to collect data to determine if there is reasonable potential for fecal coliform in the final effluent to exceed water quality standards. BP is required to monitor fecal coliform weekly beginning April 1, 2012 to November 1, 2012 (the period when wildlife is the most active at the tertiary treatment system).

Toxic Pollutants

Federal regulations (40 CFR 122.44) require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

Ecology determined through review of available data and knowledge of the refinery process that the following toxic pollutants are present in the discharge: ammonia, arsenic, cadmium, chromium, copper, cyanide, mercury, nickel, selenium, sulfide, and zinc. Ecology conducted a reasonable potential to exceed analysis (see **Appendix I**) on these parameters to determine whether it would require effluent limits in this permit.

Ecology conducted the reasonable potential to exceed analysis using receiving water and waste discharge conditions that represent the critical condition. Ecology obtained the receiving water background data for the metal parameters from a study undertaken by the Western States Petroleum Association (WSPA) in 1997. The study included 10 samples taken at three different locations within Puget Sound in an effort to provide representative information about the receiving water outside the influence of the refineries. The sampling period chosen represents the critical period in the receiving water. The resulsts of this study are documented in the February 1998 report entitled *Background Metals Concentrations in Selected Puget Sound Marine Receiving Waters*. There are limited effluent data available for metals. Ecology obtained effluent values from the permit application and its inspection data.

Valid ambient background data were available for ammonia, total cyanide, fluoride, aluminum, dissolved cadmium, dissolved copper, dissolved lead, mercury, and dissolved zinc. Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge to cause a violation of water quality standards (see **Appendix I**). This determination assumes that the refinery meets the other effluent limits of this permit.

Water quality criteria for most metals published in chapter 173-201A WAC are based on the dissolved fraction of the metal (see footnotes to table WAC 173-201A-240(3); 2006). BP may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Ecology may adjust metals criteria on a site-specific

basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Ammonia

Ammonia is considered a toxic pollutant and Ecology evaluated it for reasonable potential to exceed water quality standards. Ammonia's toxicity depends on what portion is available in the unionized form. The amount of unionized ammonia depends on the pH, salinity, and temperature of the receiving marine water. Ecology must use receiving water information to evaluate ammonia toxicity.

Ecology evaluated one ambient receiving water station, GRG002, to determine the site specific acute and chronic criteria and to obtain background ammonia data. Located in the Straits of Georgia near Patos Island, GRG002 is a long term core station for which substantial data exists, and which adequately represents the receiving water environment near BP's outfall. Using Hampson's model in a spreadsheet form, Ecology calculated the acute and chronic ammonia criteria. From those criteria, Ecology used the 90th percentile value to represent the critical condition as recommended by the Ecology Permit Writer's Manual. It used the values for the ambient station and the 90th percentile values for background total ammonia concentration in the reasonable potential calculation shown in **Appendix I**. With the available dilution at BP, Ecology determined no reasonable potential for BP to exceed water quality standards for ammonia at the edge of the acute and chronic dilution zones.

Cyanide

Ecology completed an evaluation of BP's cyanide data to determine if it had a reasonable potential to exceed marine cyanide criteria. It used cyanide data from the effluent characterization in the permit renewal application to determine the maximum value, and the statistical parameter used in the cyanide reasonable potential to exceed analysis. With the available dilution, Ecology determined that BP's effluent does not have reasonable potential to exceed the acute or chronic cyanide criteria in Washington's Water Quality Standards (see **Appendix I**). As a result, the proposed permit does not include limits for cyanide.

STORMWATER OUTFALLS 002-007

Stormwater discharges from Outfalls 002-007 are managed by the use of BMPs and monitoring for comparison to benchmark pollutant concentrations. The benchmarks are set at levels deemed protective of water quality standards in the receiving waters. Much of the stormwater from BP runs off from lands not significantly exposed to industrial activities or materials and with little impermeable surfaces. At times of the year, most of the stormwater percolates into the ground and does not discharge offsite at the outfalls.

Continued monitoring of toxics will provide a database to set limits when stormwater mixing zone guidance or a regulation is available. If future data collected indicate a problem, Ecology may require a mixing study to determine the actual mixing available or may require an evaluation of additional best management practices.

F. Whole Effluent Toxicity

The water quality standards for surface waters forbid discharge of effluent that causes toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly, by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

- *Acute toxicity tests measure mortality as the significant response* to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests find early indications of any potential lethal effect of the effluent on organisms in the receiving water.

- *Chronic toxicity tests measure various sublethal toxic responses* such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test on an organism with an extremely short life cycle, or a partial life cycle test during a critical stage of a test organism's life. Some chronic toxicity tests also measure organism survival.

Ecology-accredited WET testing laboratories use the proper WET testing protocols, fulfill the data requirements, and submit results in the correct reporting format. Accredited laboratory staff know about WET testing and how to calculate an NOEC, LC_{50}, EC_{50}, IC_{25}, etc. Ecology gives all accredited labs the most recent version of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* (http://www.ecy.wa.gov/biblio/9580.html), which is referenced in the permit. Ecology recommends that the Permittee sends a copy of the acute or chronic toxicity sections(s) of its NPDES permit to the laboratory.

Acute Toxicity

As required in the previous permit, the refinery conducted quarterly acute toxicity testing using Pimephales promelas and Daphnia magna on a rotating basis. The acute toxicity test was performed using 100% effluent, the acute critical effluent concentration (ACEC) **3.6%**, and a control. The results of the acute toxicity test in **Appendix L** indicate that on 17 occasions (out of 55 tests) the refinery found acute toxicity at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity. No acute toxicity tests conducted under the current permit exceeded the acute toxicity limit.

The proposed permit will impose an acute toxicity limit. The effluent limit for acute toxicity is: **No acute toxicity detected in a test sample representing the acute critical effluent concentration ACEC, 3.6% of the effluent, and the control.**

Compliance with an acute toxicity limit is measured by an acute toxicity test comparing test organism survival in the ACEC (using a sample of effluent diluted to equal the ACEC) to survival in nontoxic control water. BP is in compliance with the acute toxicity limit if there is no statistically significant difference in test organism survival between the ACEC sample and the control sample.

Chronic Toxicity

As required in the current permit, the Permittee conducted chronic toxicity testing on the final effluent during the third or fourth year of the permit term. BP conducted the testing every third month for a period of one year (four times) in 2002. The two organisms tested were Top Smelt and Blue Mussel. Results of the chronic characterization study in **Appendix L** showed no reasonable potential for effluent discharges to cause receiving water chronic toxicity. The proposed permit will not impose a chronic WET limit. The BP Cherry Point Refinery must retest the effluent before submitting an application for permit renewal in order to demonstrate that chronic toxicity has not increased in the effluent. In addition:

- If BP makes process or material changes which, in Ecology's opinion, increase the potential for effluent toxicity, then Ecology may (in a regulatory order, by permit modification, or in the permit renewal) require the facility to conduct additional effluent characterization
- If WET testing conducted for submittal with a permit application fails to meet the performance standards in WAC 173-205-020, Ecology will assume that effluent toxicity has increased. BP may demonstrate to Ecology that effluent toxicity has not increased by performing additional WET testing after it has made the process or material changes.

CHERRY POINT HERRING

The Pacific herring, *Clupea pallasi*, stock which spawns in the Cherry Point vicinity, near Bellingham, was once the largest in Washington. The stock has dramatically declined in abundance in the last 10-15 years and remains at record low levels. Cherry Point herring once had a spawning biomass equal to that of all of the other herring stocks in the state combined. The Cherry Point stock size has declined from nearly 15,000 tons in 1973 to only 774 tons in 2010.

Although much of the decline may be due to natural factors (e.g., temperature increases, predation, lack of food source), point and non-point sources of pollution may be potential stressors acting in concert with the natural stressors. Because of the large amount of industrial activity at Cherry Point associated with refineries and other heavy industry, it has been suggested that contamination of the spawning grounds may be causing or contributing to the decline.

In response to this concern, Ecology and Western Washington University developed and validated herring toxicity tests to use for routine effluent testing. In November 2005, Ecology approved the regulatory use of a 96-hour herring prolarval acute survival test and a 10-day herring embryo survival and normal development test. A 7-day larval survival and growth test was validated and approved for regulatory use in December 2011.

In April 2006, Ecology issued an agreed order to the BP Cherry Point Refinery, ConocoPhillips Ferndale Refinery, Shell Puget Sound Refinery, Tesoro Anacortes Refinery, and the Alcoa-Intalco Works Aluminum Smelter requiring them to conduct larval acute survival tests twice annually at each of their process wastewater outfalls. The order included a requirement to follow up on any adverse effects found during the course of these studies with additional testing and/or investigation. Ecology defined adverse effects as the Lowest Observable Effects Concentration (LOEC) being equal to or lower than the Acute Critical Effluent Concentration (ACEC).

The agreed order stated that if the LOEC was equal to or lower than the ACEC, BP must develop and implement a Toxicity Identification/Reduction Evaluation (TI/RE) Plan. The order also stated that with prior approval from Ecology, BP could use the topsmelt *Atherinops affinis*, 96-hour acute survival test as an alternate test if herring larvae are unavailable during the test window.

In 2007-2010, half the herring tests of BP's effluent showed no toxicity at all. Although the other half showed some toxicity, they did not trigger additional testing or investigation. In several cases, BP was unable to obtain herring larvae during the test window and Ecology approved the use of the topsmelt test as a substitute.

The results of the herring larval acute testing and topsmelt testing for BP are summarized in **Appendix L**.

Herring toxicity testing is included in the proposed permit. BP is required to conduct acute testing using the prolarval acute survival test and chronic testing using the embryo survival and normal development test and the larval survival and growth test. The permit requires that effluent monitoring be done with both and standard EPA toxicity tests.

The permit requires a toxicity investigation if testing shows any adverse effects. The EPA tests can be used to investigate the cause of any significant toxicity and the findings of the investigation can be confirmed with the herring tests.

Another goal in pairing the herring tests with EPA tests is to discover the extent to which EPA tests can be used to long term to protect herring. Herring are completely unavailable for testing outside of the six-month West Coast spawning season. Effectively monitoring effluents and controlling toxicity requires more frequent testing than is possible using test organisms from the spawning of wild herring. The standard EPA toxicity tests are readily available all year and can be set up quickly if needed. The permit requrirements seek to establish the relative sensitivity of herring tests and analogous EPA tests and to examine the responses of both tests to effluent constituents known to be toxic.

The herring toxicity testing in the proposed permit does not have to meet EPA standards. This testing is not for compliance monitoring or effluent characterization so the requirements of WAC 173-205-050(1)(d) do not apply.

G. Human Health

Washington's water quality standards include 91 numeric human health-based criteria that Ecology must consider when writing NPDES permits. These criteria were established in 1992 by the U.S. EPA in its National Toxics Rule (40 CFR 131.36). The National Toxics Rule allows states to use mixing zones to evaluate whether discharges comply with human health criteria.

Ecology determined that BP's effluent may contain chemicals of concern posing a risk to human health. Ecology determined this because data or process information indicate regulated chemicals occur in the discharge.

Ecology conducted a determination of the discharge's potential to violate the water quality standards as required by 40 CFR 122.44(d) by following the procedures published in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and

Ecology's Permit Writer's Manual (Ecology Publication 92-109, July, 2006) to make this reasonable potential determination.

BP submitted effluent characterization data for evaluating human health criteria as part of their permit renewal application dated May 03, 2004. Reasonable potential to exceed human health criteria is evaluated for each parameter in **Appendix I**. Ecology's evaluation showed that the discharge has no reasonable potential to cause a violation of water quality standards, thus an effluent limit is not warranted.

Arsenic

In 1992, the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 μg/L inorganic arsenic and is based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 μg/L and is based on exposure from fish and shellfish tissue and water ingestion. These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 10 μg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution zone is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all dischargers, Ecology does not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

1. Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria. The revision of the drinking water MCL for arsenic offered a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers, however Ecology was unsuccessful in focusing the discussion on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources. The current arsenic MCL of 10 μg/L could also result in municipal treatment plants being unable to meet criteria-based effluent limits. Ecology will continue to pursue this issue as opportunities arise.

2. Additional and more focused data collection. The Water Quality Program will in some cases require additional and more focused arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington

NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

3. Data sharing. Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

Dioxin

EPA traced the dioxins found in some refinery effluents to an internal waste stream from the regeneration of catalytic reformer units. The BP Cherry Point refinery has two catalytic reformer units, each regenerates once every 3 to 18 months, although not necessarily at the same time. BP has not detected dioxin in its final effluent, but even if present, it would be difficult to detect due to dilution with other process wastewaters prior to entering the wastewater treatment plant and the intermittent generation of the caustic wash water from the reformers.

Ecology has determined that further investigation into the generation of dioxins at refineries is necessary. The previous permit required BP to monitor the dioxin and furan in the regeneration wastewater stream, in the API separator sludge, and in the final effluent captured at the time that is most likely to contain wastewater generated during the catalytic reformer regenerated events. The analysis included chlorinated dioxins and furans (2,3,7,8-Cl substituted tetra- through octa- congeners). The permit specified the test method and the required detection level.

BP also investigated the fate of any dioxins and furans. Literature has shown that dioxins tend to bind to particulate matter in the wastewater, much of which settles out in the API separators.

BP's Dioxin Study Report submitted to Ecology on July 12, 2001 indicated that 2,3,7,8 TCDD was detected in one sample (Reformer #2 Regen wash water – Spring 2001). The measured concentration of 0.028 ng/l was above the practical reporting limit of 0.010 ng/l.

The proposed permit requires BP to sample the final effluent (Outfall 001) and the upstream wastewater stream from the catalytic reformer units for chlorinated dioxin and furan (2,3,7,8-Cl substituted tetra- through octa- congeners) concentrations **twice** during the next permit cycle.

H. Sediment Quality

The aquatic sediment standards (WAC 173-204) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website.
http://www.ecy.wa.gov/programs/tcp/smu/sediment.html

In 2001, BP conducted a marine sediment sampling and analysis study. The purpose of the study was to comply with the NPDES permit sediment monitoring requirements. Ecology reviewed the study and determined that there were gaps in the data.

BP agreed to perform another sediment recharacterization study. The objectives of the study were to:

- Obtain additional data by revisiting stations sampled in 2001 in the vicinity of the South Pier.
- Characterize baseline conditions at the North Pier following its construction.

BP conducted the study in the fall of 2006 in accordance with the *2006 Sediment Recharacterization Sampling and Analysis Plan* approved by Ecology on September 13, 2006. Several stations at the South Pier showed exceedances of the chemical Sediment Quality Standards (SQS) and cleanup screening levels. Per the *Sediment Management Standards*, sediment bioassay results override chemical results [WAC 173-204-310(2)]. During the 2006 sediment sampling event, stations that had chemical exceedances passed the confirmatory bioassay. Therefore, no further action was required. One station at the South Pier also had an exceedance of the SQS biological critiera, which was believed to be due to a high percentage of fines in the sample. BP found no chemical or biological exceedances at the North Pier stations.

The proposed permit requires a sediment toxicity analysis of samples collected from the top 10 cm of sediment at the North and South piers. This sediment monitoring is required to be conducted at the end of the proposed permit cycle, which is 10 years after the 2006 sediment sampling event.

BP must collect enough sediment so that it can analyze conventional sediment parameters, conduct bioassays, and if necessary, analyze chemistry. Samples showing biological exceedances will be required to undergo chemical analysis. The proposed permit also requires sediment monitoring at the North Pier if Ecology determines that significant spills have occurred since the 2006 baseline sediment characterization.

I. Ground Water Quality Monitoring

The Ground Water Quality Standards, (Chapter 173-200 WAC), protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

All of the ponds in BP's wastewater treatment system have native clay bottoms and could potentially discharge to ground water. Based on an analysis of the water in these ponds, it has been determined that there is a potential for an impact to ground water beneath the ponds.

The refinery conducted a Ground Water Impact Study (GWIS) under an Agreed Order (No. DE 01TCPIS-1959) issued by Ecology in 2001 to assess the potential groundwater impacts beneath the wastewater treatment ponds. The GWIS included installation of three wells surrounding the basins and quarterly sampling of the basin waters and groundwater for one year. **Appendix M** summarizes the results of the sampling.

The proposed permit requires BP to install an additional downgradient well to assess the attenuation of contaminants within the refinery property boundary. It also requires BP to monitor the new and existing wells **once** per year during the permit term. BP must submit the monitoring results to Ecology within 60 days of receiving the laboratory report. Ecology will evaluate the results and determine if there is a potential to cause a violation of the Ground Water Quality Standards.

IV. MONITORING REQUIREMENTS

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring.

The proposed permit requires BP to collect and report information in the monthly DMR about parameters that do not have limits established in the permit. Ecology needs data on crude feedstock rates to evaluate technical discharge limits in the next permit. It needs the ballast water flow rate and total flow rate to determine the wasteload allocation for several parameters. It used rainfall data to determine if the refinery can use the stormwater allocation. Ecology will use the temperature data to evaluate compliance with water quality standards in the receiving water. The proposed permit also requires priority pollutant testing and dioxin testing for evaluation at the next permit renewal.

A. Lab Accreditation

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories.* The BP laboratory is currently accredited for:

- Biochemical Oxygen Demand (BOD5)
- Chemical Oxygen Demand (COD)
- Total Suspended Solids (TSS)
- Phenols, Total
- pH
- Sulfide (S)
- Ammonia (N)
- Oil and Grease (O&G)
- Hexane Extractable Method

B. Performance-Based Reduction of Monitoring Frequencies

EPA published guidance in April of 1996 entitled, "Interim Guidance For Performance-Based Reduction of NPDES Permit Monitoring Frequencies". EPA's goal is to reduce the regulatory burden associated with reporting and monitoring on the basis of excellent performance. The guidance provides a tool to evaluate the facility's performance.

Ecology used this guidance to evaluate several parameters in BP's treated effluent. In addition to the approach recommended in the guidance, Ecology compared maximum values with permit limits. See **Appendix N** for the summary and evaluation of monitoring data.

For the parameters evaluated, BP's monitoring history has demonstrated an ability to consistently comply with regulatory limits. Ecology based the proposed monitoring frequencies on the guidance recommendations and best professional judgment.

Ecology elected to maintain the current monitoring frequencies for BOD5, TSS, O&G, sulfide, and phenol even though EPA's policy would have allowed less frequent monitoring. TSS and O&G are good indicators of when there is an upset condition at the wastewater treatment facility. Ecology reduced the frequency of monitoring for COD and ammonia. Ecology uses best professional judgment to determine a reduced monitoring frequency to reward BP's good performance but also provide enough data to monitor the health of the wastewater treatment process. BP must maintain good performance levels to continue to receive the reduced monitoring frequencies. If the facility's performance levels deteriorate, Ecology can revert the monitoring requirements to the previous levels.

V. OTHER PERMIT CONDITIONS

A. Priority Pollutant Testing

BP is required to sample the effluent from Outfall 001 annually and analyze the sample for priority pollutants. BP must submit the results of the analysis to Ecology within 60 days of each sampling event.

B. Reporting and Recordkeeping

Ecology based permit condition S3 on our authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

C. Operation and Maintenance Plan

Ecology requires industries to take all reasonable steps to properly operate and maintain their wastewater treatment system in accordance with state and federal regulations [40 CFR 122.41(e) and WAC 173-220-150(1)(g)]. BP has prepared and submitted an operation and maintenance plan. Implementation of the procedures in the operation and maintenance plan ensures the facility's compliance with the terms and limits in the permit.

D. Non-Routine and Unanticipated Discharges

BP occasionally generates wastewater, which was not characterized in the permit application because it is not a routine discharge and was not anticipated at the time of the application. This wastewater typically consists of water used to pressure test petroleum storage tanks or fire water systems.

When BP reconditions petroleum storage tanks, it thoroughly cleans and inspects them. The final step in the inspection is the hydrotest, which consists of filling the tank with clean water and monitoring the water level in the tank over time to see if any leakage has occurred.

Discharging the hydrotest water to the wastewater treatment system reduces the efficiency of the treatment since the clean water dilutes the process water. BP also tests its fire water system.

BP may request to discharge this wastewater through stormwater outfalls, such as when its wastewater system is experiencing heavy hydraulic loadings or when local wildlife managers request water to keep local streams or ponds viable for habitat during very dry summer conditions.

The permit authorizes non-routine and unanticipated discharges under certain conditions. The refinery must characterize these wastewaters and examine any opportunities for reuse. The wastewater must meet the applicable water quality standards for the receiving water.

E. Wastewater Treatment Efficiency Study and Updated Engineering Report

BP submitted the results of a treatment efficiency study and an engineering report for the wastewater treatment system to Ecology on June 4, 2002. Ecology approved the engineering report on January 6, 2006. The basic design criteria used to size BP's wastewater treatment system are within the acceptable range of criteria from Ecology's Sewage Works Design, Publication No. 98-37 WQ.

With the additional loadings of wastewater from the five sources below, the refinery's biological system is operating at approximately 50% of its organic (as BOD5) treatment capacity and 50% to 60% of its hydraulic loading capacity.

- The Isomerization Unit and #2 Diesel Unit
- The proposed addition of wastewater from #3 Diesel Unit and Praxair's facility
- Possible future addition of wastewater from the BP Cogeneration facility

Ecology determined that the additional process wastewater from these sources will not cause adverse effects to the refinery's wastewater treatment system and will not cause the refinery to exceed any of its NPDES permit limitations.

Ecology may require a new wastewater treatment efficiency study if BP proposes substantial alterations to the refinery that could cause a material change in the quantity or composition of the influent processed by the wastewater treatment system. In the event Ecology requires the study, BP must submit a wastewater treatment study plan for Ecology approval. BP must also update its engineering report to compare the new conditions with the predicted design capacity.

F. Pollution Prevention Plan

The previous NPDES permit required BP to submit a Pollution Prevention Plan to identify opportunities to prevent, reduce, eliminate, or control releases of pollutants to influent wastewater streams, stormwater, and other waters of the state. The permit required BP to implement opportunities that were technically and economically feasible. The NPDES Pollution Prevention Plan incorporated previous NPDES permit requirements for a spill plan, solid waste handling and disposal plan, and a stormwater pollution prevention plan.

The following are projects completed by BP during the last permit cycle that had a positive impact on wastewater treatment plant operations and provide protection to the receiving waters:

- **Eliminated Filmer from the Diesel Cold Flash Drum** – The benefit is elimination of the amine/anide filmer released to the oily water sewer.

- **Switched to Non-DEA (diethyl amine) Neutralizer in the Crude Unit and Reformer** – The chemical substitution reduces DEA releases to the oily water sewer (OWS) and reduces the risks of biological upsets at the WWTP.

- **Added High Density Polyethylene (HDPE) Liner beneath Aboveground Storage Tanks (ASTs)** – The liner will protect groundwater resources.

- **Developed Computer-Based Training** – The training is focused on pollution prevention education and identification of pollution prevention opportunities. All refinery personnel are required to complete the training.

- **Constructed Containment Berm at Wastewater Area** – The containment berm prevents off-site releases of process wastewater in the refinery wastewater area and provides additional protection against potential impacts to nearby salmon habitat in the event of a spill.

- **Upgraded WWTP-area drain sump and OWS** – The upgrade reduces the potential for direct discharges of stormwater off site during heavy rainfall events and reduces the potential for releases of process wastewater.

- **Replaced and Relocated Recovered Oil Pumps at WWTP** – The new recovered oil pumps significantly reduce the frequency of required maintenance and the potential for oil to discharge to soil during maintenance activities.

- **Installed Pump-out at No. 2 Reformer** – The refinery installed a blowdown system at the No. 2 Reformer. The project provided a closed system for draining fluids from the process unit during regenerations and other unit operations thereby preventing release of residual reformate into the oily water sewer.

- **Reduce Heat Stable Salt Formation in DEA System** - The refinery installed a membrane system to remove heat stable salts (HSS). Reduction of HSS formation in the absorbers reduces the potential for foaming, which is the primary source of DEA introduction to the oily water sewer. The project reduces the potential for wastewater treatment plant upsets.

The proposed permit includes a pollution prevention requirement to follow-up on the work done by the refinery in the previous permit cycle. It includes a requirement to:

- Continue to follow and update BMPs, SOPs, and other work practices to prevent or minimize the release of pollutants to the wastewater treatment system, stormwater, and waters of the state.
- Submit an update to the current NPDES Pollution Prevention Plan.
- Submit a biennial evaluation of the Pollution Prevention Plan.

- Conduct stormwater inspections to ensure the adequacy of BMPs and to identify any unknown improper discharges to stormwater.
- Continue to identify and evaluate pollution prevention opportunities in all decisions having environmental consequences.

G. Dangerous Wastes – Permit by Rule Requirements

The proposed permit authorizes BP to treat dangerous wastes generated on or off-site at the wastewater treatment facility, under the permit-by-rule provisions of WAC 173-303-802(5). This authorization is limited to the on-site and off-site waste streams identified and characterized in the NPDES permit application and in application amendments approved by Ecology. Wastes received from off-site include ballast water and retail distribution water. Ecology determined that the waste streams from off-site are similar in nature to those generated on-site and concluded that BP's wastewater treatment facility should effectively treat them.

Effluent sampling and monitoring requirements established in the permit should adequately address the pollutants in these wastestreams. Permit-by-rule provisions cover the identified waste streams as long as the refinery complies with the conditions of the NPDES permit and with the dangerous waste requirements in WAC 173-303 pertaining to:

- Notification and identification numbers
- Designation of dangerous wastes
- Performance standards
- General waste analysis
- Security
- Contingency plans and emergency procedures
- Emergencies
- Manifest system
- Operating record
- Facility reporting

H. Outfall Evaluation

BP conducted an Outfall Evaluation on September 23, 2003. The purpose of the evaluation was to determine the condition of the discharge pipe and diffusers and to determine the extent of sediment accumulations in the outfall's vicinity. BP reported that the outfall line and diffuser were in good condition and functioning properly.

Condition S.18 in the proposed permit requires BP to conduct another outfall inspection during the next permit term and submit a report detailing the findings of that inspection.

I. General Conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual industrial NPDES permits issued by Ecology.

VI. PERMIT ISSUANCE PROCEDURES

A. Permit Modifications

Ecology may modify this permit to impose numerical limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for ground waters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

B. Proposed Permit Issuance

The proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the State of Washington. Ecology proposes to issue this permit for a term of **5** years.

VII. REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Washington State Department of Ecology.

2007. Focus Sheet on Solid Waste Control Plan, Developing a Solid Waste Control Plan for Industrial Wastewater Discharge Permittees. Publication Number 07-10-024

Washington State Department of Ecology.

Laws and Regulations(http://www.ecy.wa.gov/laws-rules/index.html)

Permit and Wastewater Related Information
(http://www.ecy.wa.gov/programs/wq/wastewater/index.html

APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

Ecology proposes to reissue a NPDES permit to the BP Cherry Point Refinery. The permit prescribes operating conditions and wastewater discharge limits. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice on April 13, 2011 in The Bellingham Herald and Ferndale Record to inform the public and to invite comment on the proposed reissuance of this National Pollutant Discharge Elimination System permit as drafted.

The Notice –

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website.).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Asks people to tell us how well the proposed permit would protect the receiving water.
- Invites people to suggest fairer conditions, limits, and requirements for the permit.
- Invites comments on Ecology's determination of compliance with antidegradation rules.
- Urges people to submit their comments, in writing, before the end of the comment period
- Tells how to request a public hearing about the proposed NPDES Permit.
- Explains the next step(s) in the permitting process.

Ecology has published a document entitled **Frequently Asked Questions about Effective Public Commenting** which is available on our website at http://www.ecy.wa.gov/biblio/0307023.html.

You may obtain further information from Ecology by telephone, (360) 407-6900 or by writing to the permit writer at the address listed below.

Liem Nguyen
Department of Ecology
Industrial Section
P.O. Box 47706
Olympia, WA 98504-7706

The primary author of this permit and fact sheet is Liem Nguyen.

APPENDIX B--GLOSSARY

1-DMax or **1-day maximum temperature -** The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or **7-day average of the daily maximum temperatures -** The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

AKART – The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and 520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual Average Design Flow (AADF)—The average of the daily flow volumes anticipated to occur over a calendar year.

Average Monthly Discharge Limit --The average of the measured values obtained over a calendar month's time.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling—A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring –Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Detection Limit – See Method Detection Level.

Dilution Factor (DF)--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limit--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum Day Design Flow (MDDF)—The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum Month Design Flow (MMDF)— The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum Week Design Flow (MWDF)— The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the pollutant concentration is above zero and is determined from analysis of a sample in a given matrix containing the pollutant.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Peak Hour Design Flow (PHDF)—The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak Instantaneous Design Flow (PIDF)—The maximum anticipated instantaneous flow.

Quantitation Level (QL)-- The smallest detectable concentration of analyte greater than the Detection Limit (DL) where the accuracy (precision &bias) achieves the objectives of the intended purpose. This may also be called Minimum Level or Reporting Level.

Reasonable Potential — A reasonable potential to cause a water quality violation, or loss of sensitive and/or important habitat.

Responsible Corporate Officer-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to receiving waters may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Solid waste -- All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the facility. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving waters.

APPENDIX C – WASTEWATER TREATMENT FLOW DIAGRAM

APPENDIX D --MONTHLY DISCHARGE MONITORING REPORTS

APPENDIX E-- TECHNICAL LIMIT CALCULATION

APPENDIX F--DRY WEATHER FLOW CALCULATION

APPENDIX G--STORMWATER ALLOCATION EVENTS

APPENDIX H--STORMWATER MONITORING DATA

APPENDIX I--REASONABLE POTENTIAL TO EXCEED ANALYSIS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on Ecology's homepage at http://www.ecy.wa.gov/programs/eap/pwspread/pwspread.html.

APPENDIX J--MIXING ZONE ANALYSIS DATA

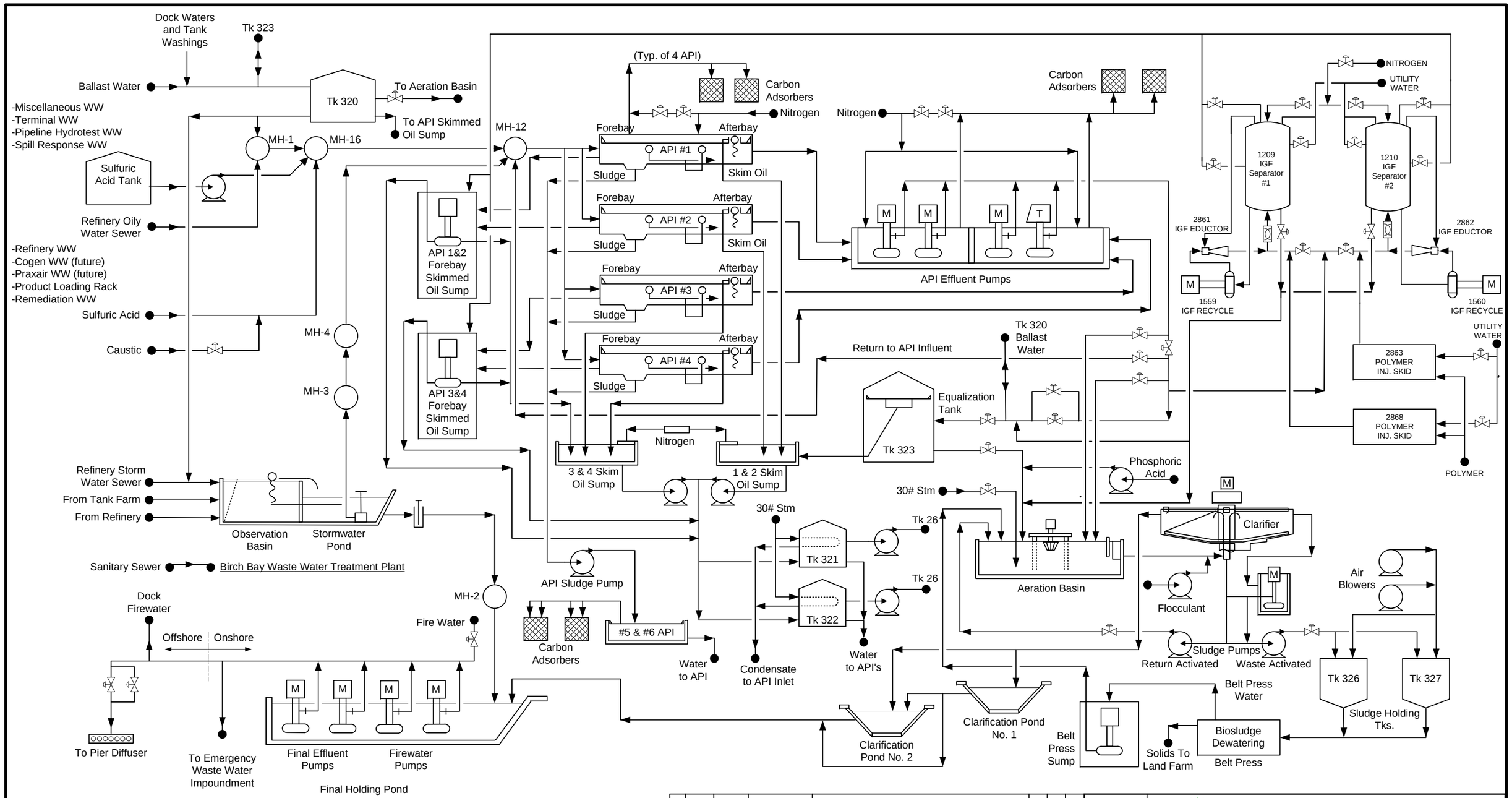
APPENDIX K—TEMPERATURE ANALYSIS

APPENDIX L-- HERRING AND WET TESTING RESULTS

APPENDIX M--GROUND WATER IMPACT STUDY RESULTS

APPENDIX N--PERFORMANCE-BASED REDUCTION OF MONITORING FREQUENCY

APPENDIX O--RESPONSE TO COMMENTS



REV.	DATE	AUTH.	PROJ. ENGR.	DESCRIPTION	BY	CKD.	APP.
8	7/06	3205AG	SHIFLETT	ADDED IGF SKIDS & ASSOC. EQUIPMENT	KF	LS	JL
7	1/03	WO18800	R. CHRISTENSEN	FIELD VERIFIED & CONVERTED TO VISIO	YW	WS	PM

DR. YW
CKD. WS
APPROVALS
PM
OPER.

BP WEST COAST PRODUCTS LLC.
Cherry Point Refinery

WASTE WATER TREATMENT SYSTEM PROCESS FLOW DIAGRAM

DATE	SCALE	AUTH
05/08	NTS	

ENGINEERING CONTRACTOR
PROJECT NO:
DWG. NO.
Figure 1
REVISION

YEAR 2000 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Degree Fahrenheit	16	70	68.6	77.9	82	94	84	84	79	77	68	66
CRUDE THROUGHPUT - MO. AVE		Bbls/DAY	183168	168111	173023	179892	182480	182439	182931	175344	189298	185764	180245	181116
BOD - AVE	1151	LB/DAY	297	268	182	170	140	224	208	221	268	188	224	146
BOD - MAX	2098	LB/DAY	527	423	341	395	294	353	359	331	670	289	520	289
pH - MIN		SU	7.4	7.4	6.8	7.0	7.0	6.8	7.2	6.9	6.9	7.1	7.1	7.0
pH - MAX		SU	7.8	7.6	7.6	7.5	7.8	8.4	8.5	8.6	7.7	7.6	7.6	7.8
TSS-AVE	923	LB/DAY	480	431	349	371	413	394	417	459	389	450	426	415
TSS-MAX	1457	LB/DAY	1179	910	690	672	1193	833	930	698	797	697	1035	784
AMMONIA-AVE	740	LB/DAY	91	111	68	56	57	39	34	90	153	141	211	187
AMMONIA-MAX	1724	LB/DAY	301	242	184	173	281	134	92	298	524	274	370	390
SULFIDE - AVE	6.2	LB/DAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SULFIDE - MAX	13.7	LB/DAY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEX. CHROMIUM - AVE	0.8	LB/DAY	0.00	0.00	0.00	0.00	nt	0.30	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	1.8	LB/DAY	0.00	0.00	0.00	0.00	nt	0.50	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - AVE	11.1	LB/DAY	0.00	0.00	0.00	0.20	0.20	0.10	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	25.2	LB/DAY	0.00	0.00	0.00	0.30	0.30	0.10	nt	nt	nt	nt	nt	nt
O & G - AVE	338	LB/DAY	182	118	115	106	127	138	170	140	148	125	108	117
O & G - MAX	629	LB/DAY	367	239	222	196	288	260	266	209	233	264	245	203
O & G - MAX	10 &15	MG/L	8.4	6.8	5.4	4.6	5.8	8.1	8.7	6.4	8.1	8.7	9.3	6
FECAL COLIFORM - AVE	200	Colonies/100mls	0	0	0	0	0	1	0	0	0	0	0	0
FECAL COLIFORM - MAX	400	Colonies/100mls	0	0	0	3	0	1	0	1	0	0	0	0
PHENOLICS - AVE	7.5	LB/DAY	0.6	0.8	0.0	0.8	0.4	1.2	0.3	1.3	3.2	3.0	2.3	0.6
PHENOLICS - MAX	15.5	LB/DAY	7.0	3.8	0.0	3.9	2.3	5.6	2.7	5.7	8.7	6.2	6.9	4.7
RAINFALL - TOTAL		INCHES	2.81	2.66	3.49	1.8	3.55	2.35	1.3	0.69	2.04	2.76	2.72	3.03
FLOW - AVE		MGD	4.7	3.9	4.3	3.6	4.0	3.6	3.4	3.8	4.3	4.3	3.9	4.0
FLOW - MAX		MGD	8.4	4.9	6.7	6.2	7.5	5.8	4.2	5.7	8.7	6.0	7.6	8.2
COD - AVE	7959	LB/DAY	2832	1816	1431	1975	2123	2590	2224	2017	2011	2540	2156	2044
COD - MAX	15461	LB/DAY	6649	3174	2519	3687	3678	5391	3453	2646	4017	5031	4509	3140
BALLAST WATER FLOW		MGD	0	0	0	0	0	0	0	0	0	0.009	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0
RES. CHLORINE - MAX		MG/L	0.18	0.11	0.05	0.15	0.12	0.09	0.14	0.22	0.16	0.18	0.15	0.12
RES. CHLORINE - AVE		MG/L	0.08	0.07	0.07						0.09	0.09	0.10	0.08
SANI-PAK														
BOD - AVE	30	MG/L					2	5	3.7	4.1	4.3	11.2	2.8	4.7
BOD - MAX	45	MG/L					3.3	7.5	6.6	7.9	6.9	27	5.4	6.4
TSS - AVE	30	MG/L					3.3	7	5.8	5.8	2.9	4.8	2.2	1
TSS - MAX	45	MG/L					12	8.5	8	18	5	10.5	12	1

YEAR 2001 - DISCHARGE MONITORING REPORT

APPENDIX D - MONTHLY DISCHARGE MONITORING REPORT SUMMARY FOR OUTFALL 001

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Degree Fahrenheit	68	70	73	77	81	81	83	85	80	74	68	63
CRUDE THROUGHPUT - MO. AVE		Bbls/DAY	176749	200478	211012	158641	200465	224910	223412	223247	176758	224002	165682	188739
BOD - AVE	1151	LB/DAY	168	266	262	469	216	371	300	250	273	452	334	452
BOD - MAX	2098	LB/DAY	519	497	485	1162	436	793	499	417	471	1252	774	858
pH - MIN		SU	6.5	7.4	7.0	7.2	6.9	7.2	7.1	6.9	6.7	7.2	7.0	6.9
pH - MAX		SU	8.0	7.6	7.8	8.1	8.1	8.5	8.6	8.0	8.2	7.6	7.6	7.7
TSS-AVE	923	LB/DAY	438	307	466	340	255	393	518	393	371	551	600	687
TSS-MAX	1570	LB/DAY	1308	510	1179	706	619	748	787	711	665	1608	1395	1553
AMMONIA-AVE	740	LB/DAY	225	189	174	252	303	334	109	240	84	131	185	196
AMMONIA-MAX	1724	LB/DAY	676	358	373	974	609	565	279	567	217	187	327	405
SULFIDE - AVE	6.2	LB/DAY	0.00	0.00	0.20	0.20	0.40	0.30	0.60	1.00	0.40	0.40	0.60	2.80
SULFIDE - MAX	13.7	LB/DAY	0.00	0.00	1.30	0.60	1.10	1.10	1.40	4.30	0.70	1.30	1.20	13.50
HEX. CHROMIUM - AVE	0.8	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	1.8	LB/DAY	nt	nt	nt	nt	<0.13	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - AVE	11.1	LB/DAY	nt	nt	0.14	nt	nt	nt	0.09	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	25.2	LB/DAY	nt	nt	0.15	nt	0.15	nt	0.10	nt	nt	nt	nt	nt
O & G - AVE	338	LB/DAY	135	81	108	103	93	96	129	99	117	105	144	120
O & G - MAX	629	LB/DAY	353	149	393	241	168	201	187	183	199	399	264	223
O & G - MAX	10 &15	MG/L	7.6	4.4	6.6	3.8	5	5.7	6.3	5.1	7.2	6.2	7.4	4.4
FECAL COLIFORM - AVE	200	Colonies/100mls	0	3	0	0	1	1	0	0	1	0	0	0
FECAL COLIFORM - MAX	400	Colonies/100mls	0	24	0	0	12	12	0	0	6	0	0	0
PHENOLICS - AVE	7.5	LB/DAY	0.7	2.4	1.0	1.8	1.1	1.1	0.9	4.1	3.6	0.8	2.6	1.7
PHENOLICS - MAX	15.5	LB/DAY	4.8	4.2	4.5	5.3	4.1	3.6	3.5	5.6	6.4	1.9	8.9	6.8
RAINFALL - TOTAL		INCHES	3.2	0.8	3.28	3.19	1.35	1.89	0.78	2.12	1.42	4.72	4.18	4.81
FLOW - AVE		MGD	4.0	3.4	4.2	4.6	3.7	3.4	3.4	3.6	3.1	3.6	4.4	4.6
FLOW - MAX		MGD	8.7	5.1	7.9	8.0	6.0	6.3	4.2	5.0	4.2	7.7	7.1	8.1
COD - AVE	7959	LB/DAY	2048	1805	2464	2104	1918	1972	2563	2119	2022	2307	2566	2183
COD - MAX	15461	LB/DAY	3852	2841	4389	4533	3501	3510	4536	5504	4164	4730	5684	5540
BALLAST WATER FLOW		AVE/MGD	0.003	0.003	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0
RES. CHLORINE - AVE		MG/L	0.08	0.07	0.09	0.07	0.07	0.06	0.08	0.08	0.07	0.09	0.08	0.07
RES. CHLORINE - MAX		MG/L	0.13	0.10	0.20	0.17	0.10	0.12	0.15	0.17	0.11	0.17	0.15	0.14
SANI-PAK														
BOD - AVE	30	MG/L	3.1	8.8	7.9	16.4	15	5.4	5	2.8	1.5	1	1	< 1
BOD - MAX	45	MG/L	6	13	10.1	34	27	7.1	5.8	5.8	3	1	1	< 1
TSS - AVE	30	MG/L	1	2.6	4.6	25.3	20	2.4	2.2	3.4	2.4	2.5	1.6	< 1
TSS - MAX	45	MG/L	2	5.5	9	33.5	30	6.0	3.0	6.5	3	4.5	2.5	< 1

YEAR 2002 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Degree Fahrenheit	66	67	72	74	77	83	86	84	80	74	72	71

APPENDIX D - MONTHLY DISCHARGE MONITORING REPORT SUMMARY FOR OUTFALL 001

CRUDE THROUGHPUT - MO. AVE		Bbls/DAY	217835	218018	212147	175211	186498	205862	206016	211139	219917	195912	203716	215506
BOD - AVE	1240	LB/DAY	749	576	444	408	262	349	325	410	493	405	656	567
BOD - MAX	2260	LB/DAY	1833	1499	823	991	763	670	1052	813	806	932	1148	1247
pH - MIN		SU	7.2	6.9	7.4	7.7	6.9	6.8	6.4	6.9	7.0	7.1	7.1	7.0
pH - MAX		SU	7.8	7.6	8.1	8.5	8.1	8.6	8.5	8.4	8.2	7.9	7.7	7.6
TSS-AVE	990	LB/DAY	574	761	467	552	393	680	594	573	510	450	797	406
TSS-MAX	1570	LB/DAY	1153	2457	1131	1622	878	1548	1499	1094	963	896	5132	1472
AMMONIA-AVE	870	LB/DAY	393	226	138	86	57	267	185	220	260	148	206	312
AMMONIA-MAX	1910	LB/DAY	846	815	352	210	113	656	681	474	425	479	523	678
SULFIDE - AVE	6.7	LB/DAY	0.80	0.50	0.40	0.30	0.20	0.50	0.40	0.30	0.10	0.40	0.40	0.50
SULFIDE - MAX	14.7	LB/DAY	1.80	1.60	0.90	1.20	0.60	2.20	1.60	0.60	0.60	0.90	1.20	1.40
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2.0	LB/DAY	<0.13	nt	nt	nt	nt	nt	nt	<0.17	nt	nt	<0.17	nt
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	<0.14	nt	nt	nt	nt	nt	nt	0.37	nt	nt	0.34	nt
O & G - AVE	360	LB/DAY	123	114	76	71	61	101	111	86	85	96	100	116
O & G - MAX	680	LB/DAY	285	277	198	198	143	238	202	146	135	233	266	235
O & G - MAX (Concentration)	10 &15	MG/L	5.4	5	5.4	5.6	4.7	6.6	5.6	4.7	5.5	4.9	7.7	6.4
PHENOLICS - AVE	8.1	LB/DAY	2.2	1.4	2.1	0.6	1.5	0.5	1.4	1.5	1.6	0.5	1.8	2.3
PHENOLICS - MAX	16.7	LB/DAY	9.6	7.4	6.8	1.7	3.3	3.8	5.2	4.4	4.0	1.1	6.9	8.3
RAINFALL - TOTAL		INCHES	5.11	3.54	1.83	2.67	1.92	1.77	0.81	0.39	1.45	0.92	4.31	3.94
FLOW - AVE		MGD	4.2	4.5	3.4	3.3	3.1	2.9	3.5	3.0	3.1	3.2	4.1	4.4
FLOW - MAX		MGD	7.7	9.8	6.0	6.9	6.6	6.5	7.8	4.4	3.8	7.2	7.8	7.8
COD - AVE	8540	LB/DAY	2034	2798	2094	2084	2389	2879	2813	2227	2791	2266	2833	2661
COD - MAX	16610	LB/DAY	5401	5642	3430	4744	3911	5027	6842	3436	6917	3644	4801	3979
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0
RES. CHLORINE - AVE		MG/L	0.10	0.08	0.06	0.03	na	- no longer chlorinating						
RES. CHLORINE - MAX		MG/L	0.15	0.13	0.14	0.13	na	- no longer chlorinating						
SANI-PAK														
BOD - AVE	30	MG/L	1	1	1.7	na	- connected to Birch Bay							
BOD - MAX	45	MG/L	1	1	2.4	na	- connected to Birch Bay							
TSS - AVE	30	MG/L	1.7	1.4	9.3	na	- connected to Birch Bay							
TSS - MAX	45	MG/L	2.5	2.5	13.5	na	- connected to Birch Bay							

YEAR 2003 - DISCHARGE MONITORING REPORT

PARAMETERS	**LIMIT**	**UNIT**	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
TEMPERATURE - MAX		Degree Fahrenheit	71	72	73	75	79	84	89	82	81	76	69	66.5
CRUDE THROUGHPUT - MO. AVE		Bbls/DAY	221959	203573	206908	206497	212010	192705	211302	209144	182519	176322	213007	201897
BOD - AVE	1240	LB/DAY	350	290	232	268	288	325	272	357	436	545	321	271
BOD - MAX	2260	LB/DAY	714	589	604	546	516	846	675	769	825	1140	944	541
pH - MIN	6	SU	7.1	7.4	7.1	6.9	7	7.16	7.2	7.05	6.93	6.93	7.15	6.89

pH - MAX	9	SU	7.7	7.8	7.9	8.5	8.5	8.97	8.94	8.98	8.1	7.87	7.95	7.8
TSS-AVE	990	LB/DAY	382	286	349	325	504	651	584	592	484	537	615	452
TSS-MAX	1570	LB/DAY	788	512	903	788	1252	1261	1389	1103	873	1378	1525	914
AMMONIA-AVE	870	LB/DAY	264	55	70	147	205	130	132	155	416	412	380	347
AMMONIA-MAX	1910	LB/DAY	550	121	205	291	385	257	262	587	632	1194	880	914
SULFIDE - AVE	6.7	LB/DAY	0.5	0.4	0.4	0.2	0.4	0.7	0.5	0.7	0.2	0.7	1.1	0.3
SULFIDE - MAX	14.7	LB/DAY	0.9	0.8	1.4	0.5	1	1.6	1.2	1.4	0.8	1.6	2.4	1.6
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	nt	nt	nt	nt	nt	<0.16	nt	nt	nt	nt	<0.1
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	nt	nt	nt	0.07	0.24	nt	nt	nt	nt	0.15
O & G - AVE	360	LB/DAY	100	63	73	99	101	87	91	122	126	143	151	100
O & G - MAX	680	LB/DAY	171	120	160	201	211	189	179	286	225	267	453	166
O & G - MAX (Concentration)	10 &15	MG/L	4.9	4	4.5	5.1	5	6.9	6.6	6.6	7.8	7.6	8.2	6.5
PHENOLICS - AVE	8.1	LB/DAY	3.3	1.4	1.3	0.4	0.7	0.7	1.6	1.5	0.4	2.8	1	0.7
PHENOLICS - MAX	16.7	LB/DAY	5.6	3.2	8.3	0.9	1.9	2.8	3.3	2.8	2	6.5	2.4	3.8
RAINFALL - TOTAL		INCHES	4.91	1.23	4.83	3.61	2.25	0.8	0.18	0.19	1.62	10.59	5.55	0.69
FLOW - AVE		MGD	4.5	3.8	4.2	3.7	3.7	2.9	2.8	3.4	3.4	5.5	4.8	3.7
FLOW - MAX		MGD	7.4	4.7	8.3	6.3	7.9	5.4	5	6.4	5.1	9.7	9.7	7.1
COD - AVE	8540	LB/DAY	2707	1845	2228	2224	2238	2080	2082	2695	2785	2926	3056	2111
COD - MAX	16610	LB/DAY	4171	3034	4097	3549	5499	4093	3770	4331	4457	8165	6936	3997
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0

YEAR 2004 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Degree Fahrenheit	68.1	68.9	72.2	78.5	81	83	86	84.4	78.91	77.1	72.1	69.4
CRUDE THROUGHPUT - MO. AVE		Bbls/DAY	201616	204337	187713	193884	97598	174598	201730	211599	189067	176322	216693	214480
BOD - AVE	1240	LB/DAY	331	370	359	251	358	403	211	213	419	351	502	401
BOD - MAX	2260	LB/DAY	830	779	836	368	794	923	366	454	711	778	987	815
pH - MIN	6	SU	7.13	7.33	6.88	7.78	7	6.72	6.99	6.67	7.1	6.4	6.98	6.33
pH - MAX	9	SU	7.75	7.92	7.9	9	9	8.39	9.01	8.97	8.53	8.7	8.04	7.68
TSS-AVE	990	LB/DAY	515	416	425	523	554	354	560	621	392	482	616	546
TSS-MAX	1570	LB/DAY	1111	1044	847	917	982	949	1097	1442	849	1309	1580	1503
AMMONIA-AVE	870	LB/DAY	358	173	58	82	120	182	39	96	141	243	295	433
AMMONIA-MAX	1910	LB/DAY	546	463	164	237	345	500	108	257	343	872	641	981
SULFIDE - AVE	6.7	LB/DAY	0.9	0.4	0.6	0.6	0.9	0.5	0.5	0.7	0.5	0.4	0.9	1.2
SULFIDE - MAX	14.7	LB/DAY	1.5	1.4	1.1	0.8	3.3	1.1	0.8	1.4	1.5	0.9	2.4	4.6
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	<0.17	nt	<0.18
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	<0.05	nt	0.223
O & G - AVE	360	LB/DAY	124	96	94	120	103	141	113	121	105	90	129	102

O & G - MAX	680	LB/DAY	165	223	177	188	194	283	214	283	220	153	318	214
O & G - MAX (Concentration)	10 &15	MG/L	4.4	4.9	4.8	6.6	4.8	10.3	6.1	8.8	5.6	6.2	7.6	4.3
PHENOLICS - AVE	8.1	LB/DAY	1.2	1.3	2.1	1.6	0.5	0.8	0.8	1.2	0.4	0.7	1.4	1.5
PHENOLICS - MAX	16.7	LB/DAY	3	5.7	5.2	3.8	1	2.3	1.5	2.6	0.8	1.9	2.4	3.1
RAINFALL - TOTAL		INCHES	2.57	1.72	3.23	0.3	1.97	0.74	0.55	2.57	3.68	3.8	8.13	5.35
FLOW - AVE		MGD	4.6	4	3.9	3.4	3.7	3.3	3.4	3.8	4.1	4.5	5.8	5.2
FLOW - MAX		MGD	8.9	8.3	6.4	4.6	5.7	6.8	4.8	6.2	6.4	8.7	9.5	9
COD - AVE	8540	LB/DAY	2545	2220	2086	2361	2441	2436	2196	2605	2402	2433	2803	2774
COD - MAX	16610	LB/DAY	4026	3895	5116	3243	4869	4756	5221	5040	3949	4073	5091	4723
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	12	0	0	0	0	0

YEAR 2005 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Degree Fahrenheit	70.5	70.5	73.7	80.1	84.2	81.7	84.5	84.5	77.4	73.7	68.1	67.5
CRUDE THROUGHPUT - MO. AVE		Bbls/DAY	214762	215913	222191	89779	78341	220193	231152	214567	177759	224378	219498	231343
BOD - AVE	1240	LB/DAY	260	321	291	507	273	444	290	441	283	433	462	395
BOD - MAX	2260	LB/DAY	468	833	906	972	403	780	575	1185	641	810	888	704
pH - MIN	6	SU	6.54	6.87	6.83	7	6.65	7.08	6.9	6.96	6.94	7	6.89	6.69
pH - MAX	9	SU	7.61	7.75	7.74	8.36	8.23	7.68	8.61	8.61	8.19	9.3	7.79	8.17
TSS-AVE	990	LB/DAY	799	466	519	586	284	506	392	426	285	514	831	575
TSS-MAX	1570	LB/DAY	2378	1170	1651	1601	612	1091	730	869	592	1431	1807	1132
AMMONIA-AVE	870	LB/DAY	312	250	288	233	249	169	296	311	400	270	274	167
AMMONIA-MAX	1910	LB/DAY	553	724	504	501	612	311	637	791	728	622	452	317
SULFIDE - AVE	6.7	LB/DAY	0.4	0.5	0.9	0.9	0.5	0.8	0.6	0.6	0.6	0.7	0.9	0.5
SULFIDE - MAX	14.7	LB/DAY	1.6	1.3	1.9	2.1	1.2	1.6	0.9	1.4	1.4	1.4	2.1	1.5
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	<0.17
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	<0.21
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	0.1
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	0.12
O & G - AVE	360	LB/DAY	109	109	146	154	90	159	126	144	105	125	130	97
O & G - MAX	680	LB/DAY	325	179	268	299	180	300	196	229	196	211	426	161
O & G - MAX (Concentration)	10 &15	MG/L	4.8	4.8	7.8	7.8	6.3	8.7	6.2	6.3	5.8	6.2	6.1	6
PHENOLICS - AVE	8.1	LB/DAY	1.4	1.1	2.3	1.4	0.3	3	1.8	2	1.6	3.2	2.6	2.6
PHENOLICS - MAX	16.7	LB/DAY	7.9	2.6	5.5	5.5	0.4	6.4	4.2	6	4.3	6.9	8.4	10.1
RAINFALL - TOTAL		INCHES	5.4	0.93	3.21	2.43	1.78	1.66	0.86	0.98	1.57	4.68	4.75	3.62
FLOW - AVE		MGD	5.5	4.2	4.7	4.1	3.1	4.1	3.7	4.4	3.9	4.7	5.7	4.5
FLOW - MAX		MGD	9.5	8.3	9.4	8.4	4.9	6.5	5.5	8	8.4	8.6	8.4	8
COD - AVE	8540	LB/DAY	2954	2438	3084	3011	1896	3062	2947	2670	2382	2518	3202	2283
COD - MAX	16610	LB/DAY	6285	4443	4885	6504	3752	4933	5182	4225	7013	6799	6696	3537
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0

YEAR 2006 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Fahrenheit	67.2	68.5	74	78	82	86.4	89.1	84.2	83.1	76.1	69.5	67.5
CRUDE THRU - AVE		Bbls/DAY	227917	207627	223013	193472	222435	234051	230403	207973	181810	151726	172921	208202
BOD - AVE	1240	LB/DAY	520	279	409	219	352	425	462	428	253	359	475	315
BOD - MAX	2260	LB/DAY	900	886	1329	368	801	725	768	915	387	710	885	754
pH - MIN	6	SU	7.7	6.9	7.2	6.7	7.0	7.1	6.9	7.9	7.0	6.9	6.7	6.8
pH - MAX	9	SU	6.8	7.7	7.8	7.7	8.8	8.4	8.3	7.0	8.1	7.5	7.7	8.0
TSS-AVE	990	LB/DAY	1065	578	473	521	524	638	752	745	474	423	779	692
TSS-MAX	1570	LB/DAY	2342	2027	946	895	895	888	1160	1383	822	1096	1837	1980
AMMONIA-AVE	870	LB/DAY	187	223	436	165	100	226	158	303	386	162	344	419
AMMONIA-MAX	1910	LB/DAY	332	546	845	492	380	421	466	774	704	547	919	816
SULFIDE - AVE	6.7	LB/DAY	1.30	0.80	0.60	0.70	0.20	0.50	1.20	1.00	0.50	1.00	0.90	0.90
SULFIDE - MAX	14.7	LB/DAY	4.00	2.30	1.40	1.80	0.90	1.30	2.80	1.90	0.80	2.70	3.00	2.10
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2	LB/DAY	nt	nt	nt	nt	nt	<0.15	nt	nt	nt	nt	nt	<0.17
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	nt	nt	nt	0.09	nt	nt	nt	nt	nt	0.48
O & G - AVE	360	LB/DAY	181	107	76	101	83	107	140	99	79	116	106.00	87
O & G - MAX	680	LB/DAY	351	239	172	209	182	201	450	243	153	290	218	169
O & G - MAX	10 &15	MG/L	5.3	6.6	5	5.4	4.8	6.3	12.1	5.1	5.5	8.4	3.5	3
PHENOLICS - AVE	8.1	LB/DAY	4.0	2.6	2.8	1.6	0.4	1.3	5.0	3.4	2.0	2.9	3.1	2.6
PHENOLICS - MAX	16.7	LB/DAY	9.2	8.0	6.0	3.6	1.1	4.0	10.4	7.5	4.1	5.9	6.4	5.5
RAINFALL - TOTAL		INCHES	9.45	1.59	1.25	2.88	1.32	1.22	0.16	0.35	2.74	2.03	10.1	4.09
FLOW - AVE		MGD	6.4	4.1	3.9	3.9	3.5	4.3	5.0	4.7	3.7	4.0	6.2	5.4
FLOW - MAX		MGD	9.5	9.0	6.2	6.4	4.8	6.7	6.6	7.3	5.1	5.5	9.6	9.1
COD - AVE	7959	LB/DAY	4693	3027	2751	3058	3384	3458	3965	3298	2415	3193	3090	3154
COD - MAX	15461	LB/DAY	11518	5159	4424	4574	6099	5275	6121	5912	4605	5599	4953	6789
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	1	0	0	0	0	0	0	0	0	0

YEAR 2007 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Fahrenheit	68.1	71.7	73.9	77.4	83.7	85.1	88.4	85.7	82.6	74.5	72.4	66.5
CRUDE THRU - AVE		Bbls/DAY	221,430	218,713	215,724	135,884	194,451	224,647	226,470	208,374	206,320	202,069	169,448	205,271
BOD - AVE	1240	LB/DAY	489	375	274	549	410	403	333	389	314	401	427	491
BOD - MAX	2260	LB/DAY	1067	900	513	1230	655	901	811	548	526	771	722	1416
pH - MIN	6	SU	6.2	7.2	6.5	6.9	6.9	5.3	6.8	7.0	7.1	6.4	7.0	7.1
pH - MAX	9	SU	7.7	7.7	7.6	7.8	8.7	8.4	8.6	8.7	7.9	7.9	8.2	7.8
TSS-AVE	990	LB/DAY	873	708	826	513	523	568	637	734	512	594	539	1000
TSS-MAX	1570	LB/DAY	2320	1543	2064	987	837	888	958	1204	925	1295	974	2985

AMMONIA-AVE	870	LB/DAY	88	124	64	187	117	83	212	206	69	202	40	85
AMMONIA-MAX	1910	LB/DAY	304	303	199	433	310	372	591	364	212	588	162	253
SULFIDE - AVE	6.7	LB/DAY	0.80	0.50	0.50	0.50	0.70	0.60	1.50	0.30	0.80	1.20	0.70	2.10
SULFIDE - MAX	14.7	LB/DAY	1.60	1.30	1.60	1.10	3.00	1.40	2.90	1.70	1.60	2.00	1.30	6.00
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	nt	nt	nt	nt	nt	nt	<0.2	<0.12	nt	nt	nt
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	0.16	0.07	nt	nt	nt
O & G - AVE	360	LB/DAY	65	91	117	120	117	104	104	90	82	81	54	92
O & G - MAX	680	LB/DAY	128	176	247	294	356	202	158	144	162	171	101	304
O & G - MAX (Concentration)	10 &15	MG/L	2.4	4.3	3.4	9	13	4.8	4.2	3.5	4.2	3.5	2.4	4
PHENOLICS - AVE	8.1	LB/DAY	3.2	1.9	2.2	3.2	2.4	2.0	2.8	1.6	2.2	2.1	1.4	2.5
PHENOLICS - MAX	16.7	LB/DAY	6.9	5.2	7.1	9.9	4.6	4.2	3.6	3.3	5.8	4.1	2.8	6.1
RAINFALL - TOTAL		INCHES	1.37	3.82	7.19	1.81	1.49	1.68	1.53	0.55	1.48	3.45	2.52	5.91
FLOW - AVE		MGD	5.6	5.4	6.4	4.3	4.3	4.5	4.9	5.0	4.4	4.8	4.2	5.6
FLOW - MAX		MGD	9.3	8.8	9.5	7.9	6.1	5.6	6.2	6.9	5.5	8.2	6.9	9.1
COD - AVE	8540	LB/DAY	3858	3064	3851	3674	4128	4269	4063	3678	3426	3258	2465	3926
COD - MAX	16610	LB/DAY	9863	6070	8535	10115	6828	7878	6262	5319	6795	5727	3781	8978
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	1	0	0	0	0	0	0

YEAR 2008 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Fahrenheit	67	73	71	75	81	85	83	83	82	76	72	71
CRUDE THRU - AVE		Bbls/DAY	201,900	214,414	220,826	186,395	215,498	221,747	216,217	220,124	214,697	211,781	233,772	220,182
BOD - AVE	1240	LB/DAY	239	227	414	284	146	182	250	211	147	181	218	431
BOD - MAX	2260	LB/DAY	444	803	699	575	198	344	410	328	295	376	659	1,637
pH - MIN	6	SU	7.3	7.1	7.2	7.3	7.3	6.9	7.2	7.7	7.3	7.3	7.0	7.3
pH - MAX	9	SU	7.8	7.7	7.8	8.0	8.7	8.7	9.1	8.8	8.5	8.0	7.8	7.6
TSS-AVE	990	LB/DAY	794	551	591	524	504	673	799	871	598	459	678	638
TSS-MAX	1570	LB/DAY	2,221	1,385	946	1,068	836	1,059	1,309	1,655	1,101	856	1,772	1,215
AMMONIA-AVE	870	LB/DAY	196	178	60	31	25	37	25	39	29	236	99	214
AMMONIA-MAX	1910	LB/DAY	617	484	188	97	126	91	64	104	78	616	286	1,146
SULFIDE - AVE	6.7	LB/DAY	1.5	0.8	0.8	0.6	0.6	0.7	1.0	0.9	0.6	0.4	0.3	0.7
SULFIDE - MAX	14.7	LB/DAY	4.3	2.0	2.0	1.4	1.1	1.3	1.7	2.0	1.5	0.8	1.2	2.4
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	<0.18	nt	nt	nt	nt	nt	nt	<0.22	nt	nt	nt
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	0.21	nt	nt	nt	nt	nt	nt	0.17	nt	nt	nt
O & G - AVE	360	LB/DAY	69	50	87	43	53	77	88	73	53	43	53	116
O & G - MAX	680	LB/DAY	136	96	201	100	107	182	196	150	138	100	169	407
O & G - MAX (Concentration)	10 &15	MG/L	2.2	2.2	4.1	2.4	3.0	5.8	6.2	5.0	3.8	3.1	3.0	13.8
PHENOLICS - AVE	8.1	LB/DAY	1.3	2.6	1.7	1.5	2.1	1.5	1.4	1.7	1.3	2.0	2.6	2.9
PHENOLICS - MAX	16.7	LB/DAY	2.6	5.9	3.9	4.0	3.7	3.0	3.1	3.3	3.0	3.6	6.2	5.1

RAINFALL - TOTAL		INCHES	4.1	2.2	3.5	1.1	1.7	1.6	0.3	2.5	0.7	1.3	5.9	3.9
FLOW - AVE		MGD	4.9	4.7	4.9	4.2	4.0	3.9	3.3	3.6	4.0	4.0	5.4	5.3
FLOW - MAX		MGD	8.6	6.5	8.1	8.0	5.5	5.2	5.2	5.9	5.2	5.4	10.1	9.5
COD - AVE	8540	LB/DAY	3,675	3,040	3,603	2,457	2,846	3,661	3,357	3,351	3,077	2,818	3,360	4,628
COD - MAX	16610	LB/DAY	8,020	4,491	8,748	4,204	4,486	6,310	6,064	6,699	4,857	3,830	6,279	11,513
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	1	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	45	0	0	0	0	0

YEAR 2009 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Fahrenheit	70	72	72	78	82	86	90	86	80	75	70	67
CRUDE THRU - AVE		Bbls/DAY	216,421	224,185	216,891	162,882	140,097	197,513	216,410	190,533	222,074	213,121	215,390	221,544
BOD - AVE	1240	LB/DAY	566	165	150	206	161	148	141	218	164	220	201	153
BOD - MAX	2260	LB/DAY	1,179	291	305	431	292	313	229	389	262	491	454	327
pH - MIN	6	SU	7.2	7.2	7.2	7.2	6.8	6.9	7.5	7.1	7.1	7.2	7.4	7.5
pH - MAX	9	SU	7.8	7.8	7.9	7.9	7.9	8.2	8.7	8.4	8.6	7.7	7.9	7.8
TSS-AVE	990	LB/DAY	767	421	554	564	382	471	638	475	423	514	658	648
TSS-MAX	1570	LB/DAY	1,538	744	890	1,545	812	932	1,023	854	793	1,272	1,894	1,558
AMMONIA-AVE	870	LB/DAY	302	18	26	64	52	91	23	169	85	207	42	27
AMMONIA-MAX	1910	LB/DAY	760	30	70	140	157	229	51	549	156	804	96	119
SULFIDE - AVE	6.7	LB/DAY	1.6	0.1	0.1	0.4	0.6	0.5	0.9	0.8	1.0	0.5	1.4	1.2
SULFIDE - MAX	14.7	LB/DAY	4.7	0.7	0.6	1.6	6.2	0.9	1.7	2.2	2.8	0.8	4.5	6.6
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	nt	<0.19	nt	nt	nt	nt	nt	nt	nt	<0.16	nt
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	0.04	nt	nt	nt	nt	nt	nt	nt	0.1	nt
O & G - AVE	360	LB/DAY	63	25	41	35	42	35	45	80	117	62	36	43
O & G - MAX	680	LB/DAY	162	70	104	117	201	78	101	272	312	145	114	167
O & G - MAX (Concentration)	10 &15	MG/L	2.7	1.9	2.2	2.8	4.0	2.5	3.1	7.2	13.7	5.0	2.3	3.1
PHENOLICS - AVE	8.1	LB/DAY	1.9	1.6	1.9	2.1	2.3	3.2	2.3	2.9	2.7	2.7	1.9	2.4
PHENOLICS - MAX	16.7	LB/DAY	4.0	3.6	3.6	5.7	3.6	5.3	3.4	4.6	4.0	4.9	3.9	4.8
RAINFALL - TOTAL		INCHES	4.2	2.1	3.0	2.1	3.0	0.4	0.7	1.3	2.0	5.2	6.4	2.3
FLOW - AVE		MGD	6.2	4.4	5.2	5.2	4.9	4.2	4.0	3.9	3.8	5.1	5.2	4.7
FLOW - MAX		MGD	9.7	7.3	7.6	9.7	7.5	5.4	5.1	5.2	4.8	9.6	9.9	8.9
COD - AVE	8540	LB/DAY	3,878	2,383	2,460	2,396	2,709	2,528	3,107	2,513	3,081	3,401	2,871	3,035
COD - MAX	16610	LB/DAY	7,728	3,391	5,206	3,228	4,211	3,749	5,892	4,150	4,789	5,157	4,937	8,161
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0

YEAR 2010 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Fahrenheit	67.8	69.2	71.8	75.4	77.9	79.9	85.5	86.5	78.6	77.2	74.1	70.6
CRUDE THRU - AVE		Bbls/DAY	202,859	215,041	212,737	215,689	217,216	217,178	211,594	211,468	208,002	205,045	210,256	210,403

BOD - AVE	1240	LB/DAY	144	111	97	148	156	283	137	118	208	179	139	121
BOD - MAX	2260	LB/DAY	247	189	154	318	416	586	307	218	419	337	412	276
pH - MIN	6	SU	7.4	7.1	7	7.1	7.1	7	6.9	7.4	7	6.8	7.5	7.3
pH - MAX	9	SU	8	7.7	7.7	7.5	7.8	7.7	8.2	7.9	7.7	8	8	7.9
TSS-AVE	990	LB/DAY	610	543	518	548	445	525	555	511	640	470	594	720
TSS-MAX	1570	LB/DAY	1307	1215	1021	1232	1210	833	1205	962	1214	887	1545	1684
AMMONIA-AVE	870	LB/DAY	21	19	26	28	70	62	28	23	28	52	21	25
AMMONIA-MAX	1910	LB/DAY	39	32	51	110	201	160	66	46	49	307	58	46
SULFIDE - AVE	6.7	LB/DAY	0.8	0.5	0.5	0.6	0.6	0.8	0.5	0.5	0.5	0.4	0.6	0.9
SULFIDE - MAX	14.7	LB/DAY	2.2	1	0.9	1.9	1.5	1.7	0.7	1	1.5	0.7	1.5	2
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	nt	nt	<0.14	nt	nt	nt	<0.04	nt	nt	nt	nt
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt
TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	nt	0.08	nt	nt	nt	0.07	nt	nt	nt	nt
O & G - AVE	360	LB/DAY	36	26	26	90	31	103	20	22	89	34	26	30
O & G - MAX	680	LB/DAY	104	71	71	241	78	393	53	88	470	140	96	89
O & G - MAX (Concentration)	10 &15	MG/L	2.7	1.4	1.5	8.6	2.2	9	2.2	3.1	12.5	2.7	1.5	2.1
PHENOLICS - AVE	8.1	LB/DAY	1.3	1.5	2	2.2	2.7	2.2	1.3	1.8	2.4	1.8	1.6	2.5
PHENOLICS - MAX	16.7	LB/DAY	2.3	2.6	3.5	5.2	5.3	3.9	2.2	2.7	5.3	3.1	4.4	5.7
RAINFALL - TOTAL		INCHES	4.38	2.69	3.51	1.68	3.01	1.83	0	1.27	5.52	2.13	3.77	5.7
FLOW - AVE		MGD	4.6	4.6	4.8	4.3	4.2	4.5	3.9	4.1	5.9	4.3	4.7	5.6
FLOW - MAX		MGD	8.7	7.7	8.5	7.8	9.1	6.6	4.4	6.1	10.5	6.6	8.8	9.7
COD - AVE	8540	LB/DAY	2236	2336	2273	3062	2561	3505	2656	2795	3316	2815	2234	2446
COD - MAX	16610	LB/DAY	3890	3772	4116	4619	4445	6256	4249	4252	6414	5096	6696	4162
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0

YEAR 2011 - DISCHARGE MONITORING REPORT

PARAMETERS	LIMIT	UNIT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE - MAX		Fahrenheit	68.2	68.3	74	73	77.5	79.4	81.6	81.7	82.3	75.5	74.4	72.2
CRUDE THRU - AVE		Bbls/DAY	186,855	193,699	208,080	82,941	40,528	210,316	224,330	216,811	225,254	206,601	213,579	218,186
BOD - AVE	1240	LB/DAY	53	54	52	57	98	62	69	89	139	72	135	88
BOD - MAX	2260	LB/DAY	85	156	127	126	250	88	127	152	242	161	371	162
pH - MIN	6	SU	7	7.6	7.5	7.4	7.1	7.2	7.4	6.9	6.6	6.7	6.8	6.9
pH - MAX	9	SU	7.8	7.8	7.8	7.8	8.1	8	8.2	7.9	7.2	7.8	7.5	7.7
TSS-AVE	990	LB/DAY	672	570	558	536	413	415	438	454	531	364	661	546
TSS-MAX	1570	LB/DAY	1941	1110	1498	1358	994	641	876	865	1184	822	1695	1053
AMMONIA-AVE	870	LB/DAY	24	18	19	19	22	17	16	25	42	17	21	17
AMMONIA-MAX	1910	LB/DAY	43	37	42	41	62	41	25	61	164	24	39	34
SULFIDE - AVE	6.7	LB/DAY	0.6	0.6	0.7	0.9	0.8	0.2	0.3	0.3	0.5	0.1	0.7	0.7
SULFIDE - MAX	14.7	LB/DAY	1.7	1.5	2.5	2.5	2.3	0.4	1	1.2	1.2	0.5	3	2
HEX. CHROMIUM - AVE	0.9	LB/DAY	nt	nt	nt	nt	nt	nt	nt	<0.09	nt	nt	nt	<0.07
HEX. CHROMIUM - MAX	2.0	LB/DAY	nt	nt	nt	nt	nt	nt	nt	<0.09	nt	nt	nt	<0.07
TOTAL CHROMIUM - AVE	12.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	0.14	nt	nt	nt	0.11

APPENDIX D - MONTHLY DISCHARGE MONITORING REPORT SUMMARY FOR OUTFALL 001

TOTAL CHROMIUM - MAX	27.5	LB/DAY	nt	nt	nt	nt	nt	nt	nt	0.14	nt	nt	nt	0.11
O & G - AVE	360	LB/DAY	31	19	31	25	24	28	26	23	27	22	26	22
O & G - MAX	680	LB/DAY	95	43	100	62	56	61	55	65	61	75	85	81
O & G - MAX (Concentration)	10 &15	MG/L	2.5	1.3	2.5	1.5	2.1	2.1	1.7	1.7	1.6	2.1	1.8	1.7
PHENOLICS - AVE	8.1	LB/DAY	1.7	0.8	1.2	0.8	0.3	1.7	1.5	0.8	1.5	1.3	0.6	1
PHENOLICS - MAX	16.7	LB/DAY	4.3	1.5	3.1	2.5	0.8	2.3	4.1	3.4	3.9	3.3	2.3	2.4
RAINFALL - TOTAL		INCHES	7.16	2.33	3.95	3.37	3.63	0.66	1.87	0.47	1.92	1.94	3.99	2.17
FLOW - AVE		MGD	5.8	4.3	4.5	4.7	4	3.6	3.8	4.1	4.4	4	5.1	4
FLOW - MAX		MGD	10.2	8.9	10	9.8	9.2	5	6.1	5.6	7.6	5.7	9.4	8.1
COD - AVE	8540	LB/DAY	2550	2155	2541	2069	1852	2236	2175	2155	2512	2216	3006	2573
COD - MAX	16610	LB/DAY	4761	3182	4909	3595	5197	2908	2989	2998	4129	3434	5721	5043
BALLAST WATER FLOW		AVE/MGD	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS > 60 MIN.		MONTH TOTAL	0	0	0	0	0	0	0	0	0	0	0	0
pH EXCURSIONS TOTAL		ACCUM. MINUTES	0	0	0	0	0	0	0	0	0	0	0	0
Note: nt - no test														

APPENDIX E - TECHNICAL LIMIT CALCULATION

Process	Process Rate (1000 bbls/day)	Capacity Relative to Throughput	Weighting Factor	Process Configuration
BASELINE:				
Crude:				
Desalting	106	1.00		
Atmospheric Distillation	106	1.00		
Vacuum Distillation	55	0.52		
Crude Total	267	2.52	1	2.52
Cracking:	35	0.33	6	1.98
Coking:	29	0.27	6	1.64
Total Process Configuration Factor				**6.14**
NEW SOURCE PERFORMANCE STANDARDS:				
PREVIOUS PRODUCTION				
Crude				
Desalting	**205**	1.00		
Atmospheric Distillation	**205**	1.00		
Vacuum Distillation	**115.1**	0.56		
Crude Total	525.1	2.56	1	2.56
Cracking:	**53.5**	0.26	6	1.57
Coking:	**55.7**	0.27	6	1.63
Total Process Configuration Factor				**5.76**
CURRENT PRODUCTION				
Crude				
Desalting	**209**	1.00		
Atmospheric Distillation	**209**	1.00		
Vacuum Distillation	**139**	0.67		
Crude Total	557	2.67	1	2.67
Cracking:	**55**	0.26	6	1.58
Coking:	**60**	0.29	6	1.72
Total Process Configuration Factor				**5.97**

The process rate information can be found tabulated in the fact sheet in the technology based limits section.

A comprehensive example of the above calculation can be found in 40 CFR Chapter 419.42(b)(3).

A **process configuration** of **6.0 - 6.49** results in a **process factor** of **1.09** in 40 CFR 419.22(b)(2).

A **process configuration** of **5.5 - 5.99** results in a **process factor** of **1.00**

Size factors are determined from the amount of feedstock per day. **100,000 to 124,900** bbls/day results in a **size factor** of **1.23** and **150,000 or greater** results in a **size factor** of **1.41** in 40 CFR 419.22(b)(1).

Baseline Process Factor = 1.09 (baseline production = 106,000 bbls/day) (as per 419.22 (b)(2))

Current Process Factor = 1.00 (current production 209,000 bbls/day) (as per 419.22 (b)(2))

APPENDIX E - TECHNICAL LIMIT CALCULATION

Baseline Size Factor =	1.23		Baseline Condition =	106,000	bbls/day	[as per 419.22(b)(1)]			
Previous Size Factor =	1.41		Baseline Condition =	205,000	bbls/day	[as per 419.22(b)(1)]			
Current Size Factor =	1.41		Current Condition =	209,000	bbls/day	[as per 419.22(b)(1)]			
Adjusted Production = Production *(Process factor)*(Size factor)									
Adjusted Baseline Production =		106,000 bbls/day * 1.09 * 1.23 =		**142,114**	bbls/day				
Adjusted Previous Production =		205,000 bbls/day * 1 * 1.41 =		**289,050**	bbls/day				
Adjusted Current Production =		209,000 bbls/day * 1 * 1.41 =		**294,690**	bbls/day				
New Source Performance Standard Increment = Adjusted Previous Production - Adjusted Baseline Production =								**146,936**	bbls/day
New Source Performance Standard Increment = Adjusted Current Production - Adjusted Baseline Production =								**152,576**	bbls/day
Technology based limits are based on the adjusted production levels, with the exception of BAT limits for phenols and chromium.									

APPENDIX E - TECHNICAL LIMIT CALCULATION FOR CRUDE THROUGHPUT AT 209,000 bbls/day

	BAT LIMITS		BASELINE PERMIT		BPT LIMITS		BASELINE PERMIT		NSPS LIMITS		NSPS		TOTAL LIMIT		TOTAL LIMIT	
	LBS/1000BBLS		BAT LIMITS		LBS/1000BBLS		BPT LIMITS		LBS/1000BBLS		INCREMENT		BPT BASIS		BAT BASIS	
			LBS/DAY				LBS/DAY				LBS/DAY		LBS/DAY		LBS/DAY	
	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY
	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE
BOD					9.9	5.5	1407	782	5.8	3.1	885	473	2292	1255		
TSS					6.9	4.4	981	625	4	2.5	610	381	1591	1007		
COD	74	38.4	10516	5457	74	38.4	10516	5457	41.5	21	6332	3204	16848	8661	16848	8661
OIL & GREASE			0		3	1.6	426	227	1.7	0.93	259	142	686	369		
AMMONIA AS N	6.6	3	938	426	6.6	3	938	426	6.6	3	1007	458	1945	884	1945	884
SULFIDE	0.065	0.029	9	4	0.065	0.029	9.24	4.12	0.037	0.017	5.65	2.59	14.88	6.72	14.88	6.72
PHENOLIC CMPDS					0.074	0.036	10.52	5.12	0.042	0.02	6.41	3.05	16.92	8.17	25.03	7.55
CRUDE	0.013	0.003	3.47	0.80												
CRACKING	0.147	0.036	11.32	2.77												
REFORMING	0.132	0.032	3.83	0.93												
TOTAL CHROMIUM					0.15	0.088	21.32	12.51	0.084	0.049	12.82	7.48	34.13	19.98	28.02	12.77
CRUDE	0.011	0.004	2.94	1.07												
CRACKING	0.119	0.041	9.16	3.16												
REFORMING	0.107	0.037	3.10	1.07												
HEX CHROMIUM					0.012	0.0056	1.71	0.80	0.0072	0.0032	1.10	0.49	2.80	1.28	2.07	0.92
CRUDE	0.0007	0.0003	0.19	0.08												
CRACKING	0.0076	0.0034	0.59	0.26												
REFORMING	0.0069	0.0031	0.20	0.09												

NOTES:

ADJUSTED BASELINE PRODUCTION IN 1000 BBLS/DAY **142.1** (See Process Factor Determination)

NSPS INCREMENT IN 1000 BBLS/DAY **152.6** (See Process Factor Determination)

For BAT Limitations:

For BAT limitations Calculations:

BASELINE (1984) CRUDE IN 1000 BBLS/DAY	267	Crude processes include desalting, atmospheric distillation, and vacuum distillation. (106 + 106 + 55 = 267)
BASELINE (1984) CRACKING IN 1000 BBLS/DAY	77	Cracking processes include hydrocracking, delayed coking and hydrotreating (35 + 29 + 13 = 77).
BASELINE (1984) REFORMING IN 1000 BBLS/DAY	29	Reforming processes include catalytic reforming.

APPENDIX E - TECHNICAL LIMIT CALCULATION FOR CRUDE THROUGHPUT AT 205,000 bbls/day

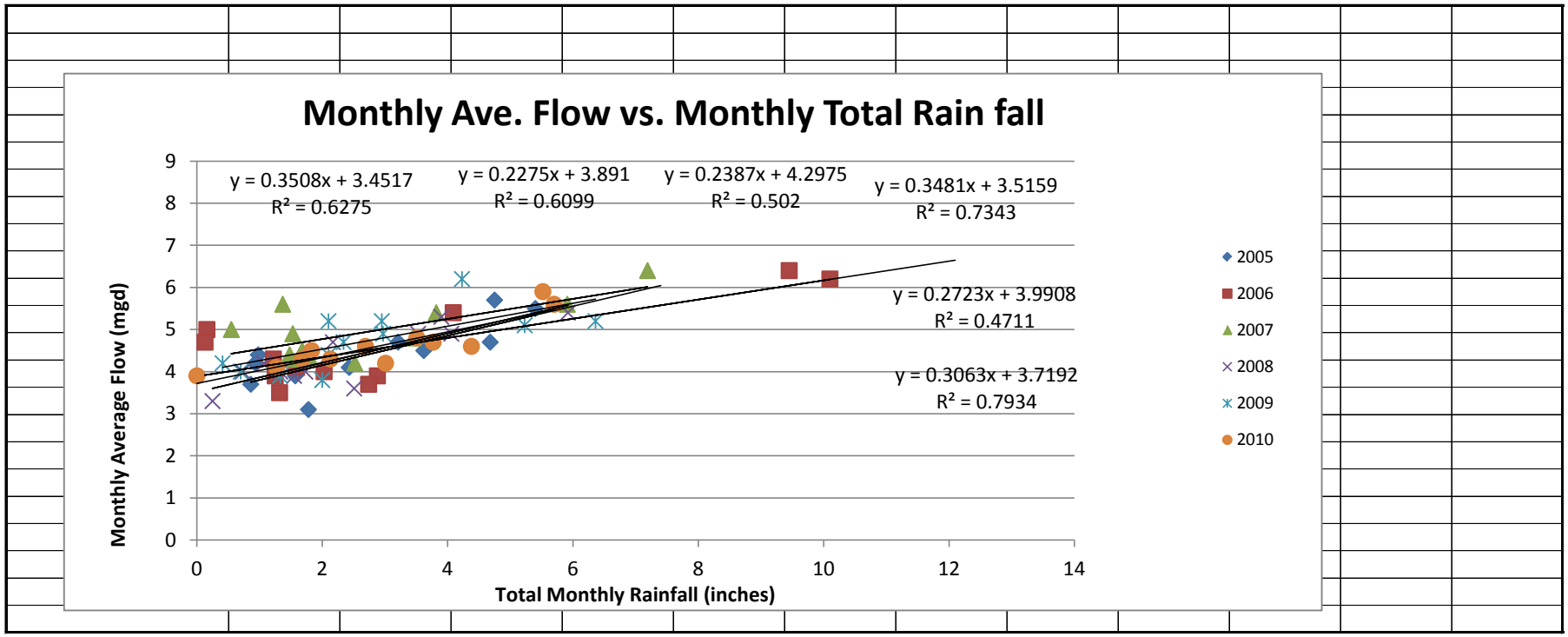
			BASELINE				BASELINE									
	BAT LIMITS		**PERMIT**		**BPT LIMITS**		**PERMIT**		**NSPS LIMITS**		**NSPS**		**TOTAL LIMIT**		**TOTAL LIMIT**	
	LBS/1000BBLS		**BAT LIMITS**		LBS/1000BBLS		**BPT LIMITS**		LBS/1000BBLS		**INCREMENT**		**BPT BASIS**		**BAT BASIS**	
			LBS/DAY				LBS/DAY				LBS/DAY					
	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY	MAX	30 DAY
	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE	DAY	AVE
BOD					9.9	5.5	1407	782	5.8	3.1	852	456	2259	1237		
TSS					6.9	4.4	981	625	4	2.5	588	367	1568	993		
COD	74	38.4	10516	5457	74	38.4	10516	5457	41.5	21	6098	3086	16614	8543	16614	8543
OIL & GREASE			0		3	1.6	426	227	1.7	0.93	250	137	676	364		
AMMONIA AS N	6.6	3	938	426	6.6	3	938	426	6.6	3	970	441	1908	867	1908	867
SULFIDE	0.065	0.029	9	4	0.065	0.029	9.24	4.12	0.037	0.017	5.44	2.50	14.67	6.62	14.67	6.62
PHENOLIC CMPDS					0.074	0.036	10.52	5.12	0.042	0.02	6.17	2.94	16.69	8.05	24.79	7.44
CRUDE	0.013	0.003	3.47	0.80												
CRACKING	0.147	0.036	11.32	2.77												
REFORMING	0.132	0.032	3.83	0.93												
TOTAL CHROMIUM					0.15	0.088	21.32	12.51	0.084	0.049	12.34	7.20	33.66	19.71	27.55	12.50
CRUDE	0.011	0.004	2.94	1.07												
CRACKING	0.119	0.041	9.16	3.16												
REFORMING	0.107	0.037	3.10	1.07												
HEX CHROMIUM					0.012	0.0056	1.71	0.80	0.0072	0.0032	1.06	0.47	2.76	1.27	2.03	0.90
CRUDE	0.0007	0.0003	0.19	0.08												
CRACKING	0.0076	0.0034	0.59	0.26												
REFORMING	0.0069	0.0031	0.20	0.09												
NOTES:																
ADJUSTED BASELINE PRODUCTION IN 1000 BBLS/DAY					**142.1**	(See Process Factor Determination)										
NSPS INCREMENT IN 1000 BBLS/DAY					**146.9**	(See Process Factor Determination)										
For BAT Limitations:								For BAT limitations Calculations:								
BASELINE (1974) CRUDE IN 1000 BBLS/DAY					267				Crude processes include desalting, atmospheric distillation, and vacuum distillation.							
BASELINE (1974) CRACKING IN 1000 BBLS/DAY					77				Cracking processes include hydrocracking, delayed coking and hydrotreating = 13+35+29 = 77							
BASELINE (1974) REFORMING IN 1000 BBLS/DAY					29				Reforming processes include catalytic reforming.							

APPENDIX F - DRY WEATHER FLOW CALCULATION

	Year 2005		Year 2006		Year 2007		Year 2008		Year 2009		Year 2010	
Month	**Ave. Flow**	**Rainfall**	**Ave. Flow**	**Rainfall**	**Ave. Flow**	**Rainfall**	**Ave. Flow**	**Rainfall**	**Ave. Flow**	**Rainfall**	**Ave. Flow**	**Rainfall**
	MGD	**inch**	**MGD**	**inch**	**MGD**	**inch**	**MGD**	**inch**	**MGD**	**inch**	**MGD**	**inch**
January	5.5	5.4	6.4	9.45	5.6	1.37	4.9	4.1	6.2	4.2	4.6	4.38
February	4.2	0.93	4.1	1.59	5.4	3.82	4.7	2.2	4.4	2.1	4.6	2.69
March	4.7	3.21	3.9	1.25	6.4	7.19	4.9	3.5	5.2	3.0	4.8	3.51
April	4.1	2.43	3.9	2.88	4.3	1.81	4.2	1.1	5.2	2.1	4.3	1.68
May	3.1	1.78	3.5	1.32	4.3	1.49	4.0	1.7	4.9	3.0	4.2	3.01
June	4.1	1.66	4.3	1.22	4.5	1.68	3.9	1.6	4.2	0.4	4.5	1.83
July	3.7	0.86	5.0	0.16	4.9	1.53	3.3	0.3	4.0	0.7	3.9	0
August	4.4	0.98	4.7	0.13	5.0	0.55	3.6	2.5	3.9	1.3	4.1	1.27
September	3.9	1.57	3.7	2.74	4.4	1.48	4.0	0.7	3.8	2.0	5.9	5.52
October	4.7	4.68	4.0	2.03	4.8	3.45	4.0	1.3	5.1	5.2	4.3	2.13
November	5.7	4.75	6.2	10.1	4.2	2.52	5.4	5.9	5.2	6.4	4.7	3.77
December	4.5	3.62	5.4	4.09	5.6	5.91	5.3	3.9	4.7	2.3	5.6	5.7
Average	4.38	2.66	4.59	3.08	4.95	2.73	4.35	2.40	4.73	2.73	4.63	2.96
R2	0.63		0.61		0.50		0.70		0.47		0.79	
Y-intercept (linear regression)	3.45		3.89		4.30		3.58		3.99		3.72	
Average Y-intercept		3.67		4.1		3.94		3.79		**3.87**		

The dry weather flow is determined by taking an average of the Y-interception (linear regresstion) for years 2009 and 2010 as those years had the strongest correlation between average daily flow and rainfall.

APPENDIX F - DRY WEATHER FLOW CALCULATION



APPENDIX G - STORMWATER ALLOCATION EVENTS

Date	Parameter	Unit	Discharged Daily Max	Limit allowed w/ stomwater allocation
10/31/2001	Total Suspended Solids (TSS)	lb/day	1608	2813
2/22/2002	Total Suspended Solids (TSS)	lb/day	1963	3399
2/23/2002	Total Suspended Solids (TSS)	lb/day	2457	3399
4/14/2002	Total Suspended Solids (TSS)	lb/day	1622	2600
11/3/2004	Total Suspended Solids (TSS)	lb/day	1580	3306
1/17/2005	Total Suspended Solids (TSS)	lb/day	1963	2928
1/18/2005	Total Suspended Solids (TSS)	lb/day	1666	3317
1/19/2005	Total Suspended Solids (TSS)	lb/day	1905	3320
1/20/2005	Total Suspended Solids (TSS)	lb/day	2378	3317
1/21/2005	Total Suspended Solids (TSS)	lb/day	2362	3297
3/29/2005	Total Suspended Solids (TSS)	lb/day	1651	2964
4/6/2005	Total Suspended Solids (TSS)	lb/day	1601	2508
11/4/2005	Total Suspended Solids (TSS)	lb/day	1807	2250
1/12/2006	Total Suspended Solids (TSS)	lb/day	1790	3266
1/13/2006	Total Suspended Solids (TSS)	lb/day	2342	3275
1/15/2006	Total Suspended Solids (TSS)	lb/day	2090	3073
1/17/2006	Total Suspended Solids (TSS)	lb/day	1621	3020
1/18/2006	Total Suspended Solids (TSS)	lb/day	1774	3037
1/30/2006	Total Suspended Solids (TSS)	lb/day	1975	3110
1/31/2006	Total Suspended Solids (TSS)	lb/day	1983	3213
Jan-06	Total Suspended Solids (TSS)	lb/day	1065*	1565*
2/1/2006	Total Suspended Solids (TSS)	lb/day	2027	3174
11/7/2006	Total Suspended Solids (TSS)	lb/day	1837	3336
11/18/2006	Total Suspended Solids (TSS)	lb/day	1773	3135
12/15/2006	Total Suspended Solids (TSS)	lb/day	1980	3211
1/3/2007	Total Suspended Solids (TSS)	lb/day	1955	3177
1/4/2007	Total Suspended Solids (TSS)	lb/day	2320	3250
1/23/2007	Total Suspended Solids (TSS)	lb/day	1903	3020
3/12/2007	Total Suspended Solids (TSS)	lb/day	2064	3320
3/18/2007	Total Suspended Solids (TSS)	lb/day	1580	3308
12/3/2007	Total Suspended Solids (TSS)	lb/day	2987	3099
12/4/2007	Total Suspended Solids (TSS)	lb/day	1976	3206
12/5/2007	Total Suspended Solids (TSS)	lb/day	2770	3168
12/6/2007	Total Suspended Solids (TSS)	lb/day	2189	3104
Dec-07	Total Suspended Solids (TSS)	lb/day	1000*	1404
1/10/2008	Total Suspended Solids (TSS)	lb/day	1618	2917
1/11/2008	Total Suspended Solids (TSS)	lb/day	2221	3060

APPENDIX G - STORMWATER ALLOCATION EVENTS

1/14/2008	Total Suspended Solids (TSS)	lb/day	2065	2211
11/7/2008	Total Suspended Solids (TSS)	lb/day	1659	3186
11/11/2008	Total Suspended Solids (TSS)	lb/day	1772	3488
11/23/2009	Total Suspended Solids (TSS)	lb/day	1894	3421
12/1/2010	Total Suspended Solids (TSS)	lb/day	1684	2917
* For Monthly Average				

NPDES Permit
WA-002290-0

APPENDIX H - STORMWATER MONITORING DATA

			Year 2000		Year 2001		Year 2002		2003
Parameters	**Unit**	**Benchmark Values**	1st sample	2nd sample	1st sample	2nd sample	1st sample	2nd sample	
OUTFALL 002									
BOD5	ppm	5	<1	<1.2	<1	<1.2	2	<1.2	<1
TSS	ppm	25	<1	<1	<4	<1	<4	<4	<4
COD	ppm	60	7.7	<0.5	11.4	10.3	<8	<17	<8
O&G	ppm	15	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
pH	SU	6-9	7.7	7.1	7.4	7.4	7.5	7.7	7.15
OUTFALL 003									
BOD5	ppm	5	<1	4	1.9	<1.2	2	<1.2	<1
TSS	ppm	25	<1	<1	<4	<1	<4	<4	<4
COD	ppm	60	15.5	2.8	13.5	13.3	8	18	14
O&G	ppm	15	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
pH	SU	6-9	7.5	7.1	7.3	7.2	6.9	7	6.82
Note: Ecology approved BP to reduce stormwater monitoring frequency from semi-annually to annually on March 12, 2003.									
			2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
OUTFALL 002									
BOD5	ppm	5	2	2	1	<1	3	2	<1
TSS	ppm	25	16	13	<4	<4	<4	5	22
COD	ppm	60	11	27	18	11	26	9	20
O&G	ppm	15	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
pH	SU	6-9	7.05	7.5	6.3	7.62	7.72	7.38	7.43
OUTFALL 003									
BOD5	ppm	5	7	9	2	2	3	32	<1
TSS	ppm	25	21	<4	<4	<4	<4	5	<4
COD	ppm	60	57	23	15	17	27	88	21
O&G	ppm	15	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
pH	SU	6-9	6.52	7.3	8.1	7.63	7.83	7.06	7.38

STORMWATER OUTFALL CHARACTERISTICS

		Outfall 002	**Outfall 003**		**Outfall 004**		**Outfall 005**		
Pollutant	**No. of Sample**	**Flow Weighted Composite**	**Grab sample taken during 1st 20 min.**	**Flow Weighted Composite**	**Grab sample taken during 1st 20 min.**	**Flow Weighted Composite**	**Grab sample taken during 1st 20 min.**	**Flow Weighted Composite**	
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Oil and Grease	8	N/A	<2.5	N/A	<2.5	N/A	<2.5	N/A	
BOD5	8	3	7	6	10	7	22	13	
COD	8	14	57	71	70	61	110	79	
TSS	8	101	21	20	115	129	68	16	
Total Nitrogen	1	2.2	3.96	2.64	2.3	2.4	2.905	30.1	
Total Phosphorous	1	0.19	0.13	0.1	0.2	0.2	0.3	0.2	
pH	1	7.68	6.82	7.5	N/A	6.8	N/A	6.5	
Ammonia	1	0.17	0.2	0.36	0.15	0.13	0.24	0.25	
Phenol, Total	1	<0.05	<0.05	<0.05	N/A	N/A	<0.05	<0.05	
Sulfide	1	<0.1	0.1	0.1	0.32	0.32	<0.1	<0.1	
Chromium	1	9*	<10*	<10*	8.4*	12*	3.5	2.9	
Chromium, Hexavalent	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	

APPENDIX H - STORMWATER MONITORING DATA

Color	1	>50	>50	>50	>50	>50	>50	>50	
Nitrate-Nitrite as N	1	1.2	2.36	1.14	0.905	0.895	0.805	0.81	
Nitrogen, Total Organic as N	1	0.83	1.4	1.14	1.25	1.37	1.86	1.95	
Sulfate	1	25	13	10	49	43	15	16	
Aluminum, Total	1	5300*	779*	512*	3870*	5850*	1220*	727*	
Barium, Total	1	62*	20*	33*	51*	54*	47*	45*	
Iron, Total	1	8020*	1290*	6690*	4970*	7340*	4350*	3830*	
Magnesium, Total	1	6.5	3.8	23	7100*	7000*	19	19	
Zinc, Total	1	275*	57*	47*	51*	54*	39*	29*	
Note: (*) means ppb									
All data are taken from 2F forms in renewal application.									
SU - Standard Unit									

NPDES Permit
No. WA-000295-0

APPENDIX I - AQUATIC LIFE CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

REASONABLE POTENTIAL CALCULATION - MARINE WATER				Water Quality Criteria		Max concentration at edge of...											
NPDES PERMIT NO. WA-002290-0 OUTFALL 001	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value			effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*		*ug/L*	*CV*	*s*	*4*			
ACENAPTHENE 83329 1B									0.95	0.050			0.60	0.55	1	6.20	28	110
ACROLEIN 107028 1V									0.95				0.60	0.55			28	110
ACRYLONITRILE 107131 2V									0.95				0.60	0.55			28	110
ALKALINITY									0.95				0.60	0.55			28	110
ALDRIN 309002 1P				0.71	0.0019				0.95				0.60	0.55			28	110
ALUMINUM, total recoverable, pH 6.5-9.0 7429905			45.2			81.22	54.37		0.95	0.050		170.0	0.60	0.55	1	6.20	28	110
AMMONIA unionized -see seperate spreadsheets for FW criteria			16.0	233.00	35.00	60.05	27.21	NO	0.95	0.992		1900.0	0.60	0.55	365	0.66	28	110
ANTHRACENE 120127 3B									0.95	0.050			0.60	0.55	1	6.20	28	110
ANTIMONY (INORGANIC) 7440360 1M						0.19	0.05		0.95	0.224		1.4	0.60	0.55	2	3.79	28	110
ARSENIC (dissolved) 7440382 2M	1.00			69	36	2.03	0.52	NO	0.95	0.224		15.0	0.60	0.55	2	3.79	28	110
ARSENIC (inorganic)									0.95				0.60	0.55			28	110
ASBESTOS 1332214									0.95				0.60	0.55			28	110
ATRAZINE				760.00	26.00				0.95				0.60	0.55			28	110
BACTERIA									0.95				0.60	0.55			28	110
BENZENE 71432 3V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BENZIDINE 92875 4B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BENZO(a)ANTHRACENE 56553 5B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BENZO(a)PYRENE 50328 6B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BENZO(b)FLUORANTHENE 205992 7B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BENZO(k) FLUORANTHENE 207089 9B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BERYLLIUM 7440417 3M						0.14	0.03		0.95	0.224	<	1.0	0.60	0.55	2	3.79	28	110
BHC - ALPHA 319846 2P									0.95				0.60	0.55			28	110
BHC - BETA 319857 3P									0.95				0.60	0.55			28	110
BHC - GAMMA 58899 4P (Lindane)				0.16					0.95				0.60	0.55			28	110
BHC - DELTA 319868 5P									0.95				0.60	0.55			28	110
BIS(2-CHLOROETHYL)ETHER 111444 11B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BIS(2 CHLOROISOPROPYL)ETHER 39638329 12B									0.95				0.60	0.55			28	110
BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B						0.66	0.17		0.95	0.050	<	3.0	0.60	0.55	1	6.20	28	110
BROMOFORM 75252 5V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
BUTYLBENZYL PHTHALATE 85687						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
CADMIUM - 7440439 4M Hardness dependent	0.994	0.994	0.0590	42.00	9.3	0.09	0.07	NO	0.95	0.224	<	0.3	0.60	0.55	2	3.79	28	110
Based on hardness in next column									0.95				0.60	0.55			28	110
CARBON TETRACHLORIDE 56235 6V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
CHLOROBENZENE 108907 7V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
CHLORDANE 57749 6P				0.09	0.004				0.95				0.60	0.55			28	110
CHLORODIBROMOMETHANE 124481 8V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
CHLORIDE (dissolved) in mg/L 16887006									0.95				0.60	0.55			28	110
2-CHLORONAPTHALENE 91587 16B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
CHLORINE (Total Residual) 7782505				13	7.50	11.07	2.82		0.95	0.050	<	50.0	0.60	0.55	1	6.20	28	110
CHLOROETHYL ETHER (BIS - 2) 111444									0.95				0.60	0.55			28	110
CHLOROFORM 67663 11V						0.44	0.11	NO	0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
CHLOROISOPROPYL ETHER (BIS-2) 108601									0.95				0.60	0.55			28	110
2-CHLOROPHENOL 95578 1A						0.44	0.11	NO	0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
4-CHLOROPHENOL 106489									0.95				0.60	0.55			28	110
CHLOROPHENOXY HERBICIDES(2,4-D) 94757									0.95				0.60	0.55			28	110
CHLORPYRIFOS 2921882				0.011	0.0056			NO	0.95				0.60	0.55			28	110
CHROMIUM(HEX) 18540299	0.993	0.993		1100	50	0.79	0.20	NO	0.95	0.050		3.6	0.60	0.55	1	6.20	28	110
CHROMIUM(TRI) -16065831 5M Hardness dependent									0.95				0.60	0.55			28	110
Based on hardness in next column									0.95				0.60	0.55			28	110
CHRYSENE 218019 18B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
COLOR									0.95				0.60	0.55			28	110

APPENDIX I - AQUATIC LIFE CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

REASONABLE POTENTIAL CALCULATION - MARINE WATER				Water Quality Criteria		Max concentration at edge of...												
NPDES PERMIT NO. WA-002290-0 OUTFALL 001	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value			effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*		*ug/L*	*CV*	*s*	*4*			
COPPER - 744058 6M Hardness dependent	0.83	0.83	0.6730	4.80	3.10	0.97	0.75	NO	0.95	0.607		5.0	0.60	0.55	6	2.14	28	110
Based on hardness in next column									0.95				0.60	0.55			28	110
CYANIDE 57125 14M				9.10	2.80	1.11	0.28	NO	0.95	0.050	<	5.0	0.60	0.55	1	6.20	28	110
DDT 50293 7P				0.13	0.001				0.95				0.60	0.55			28	110
DDT METABOLITE (DDE) 72559 8P				0.13	0.001				0.95				0.60	0.55			28	110
DDT METABOLITE (DDD) 72548 9P				0.13	0.001				0.95				0.60	0.55			28	110
DIBENZO(a,h)ANTHRACENE 53703 19B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
DIBUTYLPHTHALATE 84742									0.95				0.60	0.55			28	110
1,2 DICHLOROBENZENE 95501 20B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
1,3 DICHLOROBENZENE 541731 21B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
1,4 DICHLOROBENZENE 106467 22B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
3,3 DICHLOROBENZIDINE 91941 23B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
DICHLOROBROMOMETHANE 75274 12V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
1,2 DICHLOROETHANE 107062 15V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
1,1 DICHLOROETHYLENE 75354 16V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
2,3 DICHLOROPHENOL									0.95				0.60	0.55			28	110
2,4 DICHLOROPHENOL 120832 2A						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
2,5 DICHLOROPHENOL									0.95				0.60	0.55			28	110
2,6 DICHLOROPHENOL									0.95				0.60	0.55			28	110
1,2 DICHLOROPROPANE 78875						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
1,3 -DICHLOROPROPYLENE 542756 18V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
DIELDRIN 60571 10P				0.71	0.0019				0.95				0.60	0.55			28	110
DIETHYLPHTHALATE 84662 24B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
2,4 DIMETHYLPHENOL 105679						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
DIMETHYLPHTHALATE 131113 25B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
DI-n-BUTYL PHTHALATE 84742 26B						0.66	0.17		0.95	0.050		3.0	0.60	0.55	1	6.20	28	110
2-METHYL-4,6 -DINITROPHENOL 534521 4A						2.21	0.56		0.95	0.050	<	10.0	0.60	0.55	1	6.20	28	110
2,4-DINITROPHENOL 51285 5A						2.21	0.56		0.95	0.050	<	10.0	0.60	0.55	1	6.20	28	110
DINITROTOLUENE 2,4 121142 27B						1.11	0.28		0.95	0.050	<	5.0	0.60	0.55	1	6.20	28	110
DINITROTOLUENE 2,6 606202 28B						1.11	0.28		0.95	0.050	<	5.0	0.60	0.55	1	6.20	28	110
DIOXIN (2,3,7,8-TCDD) 1746016									0.95				0.60	0.55			28	110
1,2 DIPHENYLHYDRAZINE 122667 30B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
DI-2-ETHYLHEXYLPHTHALATE 117817									0.95				0.60	0.55			28	110
ENDOSULFAN a 959988 11P, b 33213659 12P				0.034	0.0087				0.95				0.60	0.55			28	110
ENDOSULFAN SULFATE 1031078 13P									0.95				0.60	0.55			28	110
ENDRIN 72208 14P				0.037	0.0023				0.95				0.60	0.55			28	110
ENDRIN ALDEHYDE 7421934 15P									0.95				0.60	0.55			28	110
ETHYLBENZENE 100414 19V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
FLUORANTHENE 206440 31B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
FLUORENE 86737 32B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
GASSES, TOTAL DISSOLVED									0.95				0.60	0.55			28	110
HEPTACHLOR 76448 16P				0.0530	0.0036				0.95				0.60	0.55			28	110
HEPTACHLOR EPOXIDE 1024573 17P				0.0530	0.0036				0.95				0.60	0.55			28	110
HEXACHLOROBENZENE 118741 33B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
HEXACHLOROBUTADIENE 87683 34B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
HEXACHLOROCYCLOHEXANE-ALPHA 319846 2P									0.95				0.60	0.55			28	110
HEXACHLOROCYCLOHEXANE-BETA 319857 3P									0.95				0.60	0.55			28	110
HEXACHLOROCYCLOHEXANE-GAMMA (lindane) 58899 4P				0.16					0.95				0.60	0.55			28	110
HEXACHLOROCYCLOPENTADIENE 77474 35B						2.21	0.56		0.95	0.050	<	10.0	0.60	0.55	1	6.20	28	110
HEXACHLOROETHANE 67721 36B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
INDENO(1,2,3-cd)PYRENE 193395 37B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110

APPENDIX I - AQUATIC LIFE CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

REASONABLE POTENTIAL CALCULATION - MARINE WATER				Water Quality Criteria		Max concentration at edge of...											
NPDES PERMIT NO. WA-002290-0 OUTFALL 001	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value			effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*		*ug/L*	*CV*	*s*	*4*			
IRON 7439896						61.98	15.78		0.95	0.050		280.0	0.60	0.55	1	6.20	28	110
ISOPHORONE 78591						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
LEAD - 7439921 7M Dependent on hardness	0.951	0.95	0.1460	210.00	8.10	0.21	0.16	NO	0.95	0.224	<	0.5	0.60	0.55	2	3.79	28	110
Based on hardness in next column [c]									0.95				0.60	0.55			28	110
MANGANESE 7439965						18.82	4.79		0.95	0.050		85.0	0.60	0.55	1	6.20	28	110
2-METHYL-4-CHLOROPHENOL									0.95				0.60	0.55			28	110
3-METHYL-4-CHLOROPHENOL 59507						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
3-METHYL-6-CHLOROPHENOL									0.95				0.60	0.55			28	110
METHYL BROMIDE 74839 20V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
METHYLENE CHLORIDE 75092 22V						1.11	0.28		0.95	0.050	<	5.0	0.60	0.55	1	6.20	28	110
MERCURY 7439976 8M	0.85		0.0010	1.80	0.0250	0.00	0.00	NO	0.95	0.224		0.0070	0.60	0.55	2	3.79	28	110
MONOCHLOROBENZENE 108907									0.95				0.60	0.55			28	110
NAPHTHALENE 91203 39B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
NICKEL - 7440020 9M - Dependent on hardness	0.99	0.99		74.00	8.20	5.43	1.38	NO	0.95	0.224		40.5	0.60	0.55	2	3.79	28	110
Based on hardness in next column									0.95				0.60	0.55			28	110
NITROBENZENE 98953 40B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
2-NITROPHENOL 88755						1.11	0.28		0.95	0.050	<	5.0	0.60	0.55	1	6.20	28	110
NITRATE/NITRITE (N)						22.14	5.63		0.95	0.050	<	100.0	0.60	0.55	1	6.20	28	110
NITROSAMINES									0.95				0.60	0.55			28	110
NITROSODIBUTYLAMINE N 924163									0.95				0.60	0.55			28	110
NITROSODIETHYLAMINE, N 55185									0.95				0.60	0.55			28	110
NITROSODIMETHYLAMINE N 62759 41B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
N- NITROSODI-N-PROPYLAMINE 621647						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
NITROSODIPHENYLAMINE N 86306 43B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
NITROSOPYRROLIDINE, N 930552									0.95				0.60	0.55			28	110
OIL AND GREASE						321.73	81.89		0.95	0.992		13700.0	0.60	0.55	365	0.66	28	110
OXYGEN DISSOLVED 7782447									0.95				0.60	0.55			28	110
PARATHION 56382									0.95				0.60	0.55			28	110
PENTACHLOROBENZENE 608935									0.95				0.60	0.55			28	110
PENTACHLOROPHENOL 87865 8A (pH dependent in				13.00	7.90	2.21	0.56	NO	0.95	0.050	<	10.0	0.60	0.55	1	6.20	28	110
fresh water) Enter pH in next cell>>>>>>>>									0.95				0.60	0.55			28	110
pH					7.0 - 8.5				0.95				0.60	0.55			28	110
PHENOL 108952 10A						2.21	0.56		0.95	0.944		60.0	0.60	0.55	52	1.03	28	110
Polychlorinated Biphenyls (PCB's) 53469219, 11097691, 1104282, 11141165, 12672296, 11096825,				10	0.03				0.95				0.60	0.55			28	110
PYRENE 129000 45B						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
SELENIUM 7782492 10M				290	71	10.30	2.62	NO	0.95	0.224		76.0	0.60	0.55	2	3.79	28	110
SILVER - 7740224 11M dependent on hardness.	0.85			1.90	NA	0.02	0.01	NO	0.95	0.224	<	0.2	0.60	0.55	2	3.79	28	110
Based on hardness in next column									0.95				0.60	0.55			28	110
SOLIDS,DISSOLVED AND SALINITY									0.95				0.60	0.55			28	110
SOLIDS,SUSPENDED AND TURBIDITY									0.95				0.60	0.55			28	110
SULFIDE, HYDROGEN SULFIDE 7783064					2.0	0.74	0.19	NO	0.95	0.944		20.0	0.60	0.55	52	1.03	28	110
TETRACHLOROETHANE 1,1,2,2 79345 23V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
TETRACHLOROETHYLENE 127184 24V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
TETRACHLOROPHENOL 2,3,4,6 95954									0.95				0.60	0.55			28	110
THALLIUM 7440280 12M						0.14	0.03		0.95	0.224	<	1.0	0.60	0.55	2	3.79	28	110
TOLUENE 108883 25V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
TOXAPHENE 8001352 25P				0.21	0.0002				0.95				0.60	0.55			28	110
1,2-TRANS-DICHLOROETHYLENE 156605						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
TRIBUTYLTIN (TBT)				0.37	0.010				0.95				0.60	0.55			28	110
TRICHLOROBENZENE 1,2,4 120821						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
TRICHLOROETHANE 1,1,1 71556 27V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110

APPENDIX I - AQUATIC LIFE CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

REASONABLE POTENTIAL CALCULATION - MARINE WATER				Water Quality Criteria		Max concentration at edge of...												
NPDES PERMIT NO. WA-002290-0 OUTFALL 001	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value			effluent conc. measured (metals as total recoverable)	Coeff Variation		# of samples	Multiplier	Acute Dil'n Factor	Chronic Dil'n Factor
Parameter	Acute	Chronic	*ug/L*	*ug/L*	*ug/L*	*ug/L*	*ug/L*			*Pn*		*ug/L*	*CV*	*s*	*4*			
TRICHLOROETHANE 1,1,2 79005 28V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
TRICHLOROETHYLENE 79016 29V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
TRICHLOROPHENOL 2,4,5 95954									0.95				0.60	0.55			28	110
TRICHLOROPHENOL 2,4,6 88062 11A						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
VINYL CHLORIDE 75014 31V						0.44	0.11		0.95	0.050	<	2.0	0.60	0.55	1	6.20	28	110
ZINC- 7440666 13M hardness dependent	0.946	0.946	3.9000	90.00	81.00	6.58	4.58	NO	0.95	0.224		22.0	0.60	0.55	2	3.79	28	110
Note:																		
*** No longer chlorinating - no limit required																		

APPENDIX I - HUMAN HEALTH CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

HUMAN HEALTH CALCULATION NPDES PERMIT NO. WA-000295-0 OUTFALL 001 Parameter	Ambient Concentration (Geometric Mean) *ug/L*	Water Quality Criteria for Protection of Human Health *ug/L*	Max concentration at edge of chronic mixing zone. *ug/L*	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT *ug/L*	MAXIMUM DAILY EFFLUENT LIMIT *ug/L*	Estimated Percentile at 95% Confidence	*Pn*		Max effluent conc. measured *ug/L*	Coeff Variation *CV*	**S**	# of samples from which # in col. K was taken *n*	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
ACENAPTHENE 83329 1B		990.00	0.04	NO		NONE		0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
ACROLEIN 107028 1V		780	0.08	NO		NONE	NONE	0.50	0.47	<	10.00	0.60	0.6	4	1.04		136
ACRYLONITRILE 107131 2V		0.66	0.08	NO		NONE	NONE	0.50	0.47	<	10.00	0.60	0.6	4	1.04		136
ALKALINITY								0.50				0.60	0.6				136
ALDRIN 309002 1P		0.00014						0.50				0.60	0.6				136
ALUMINUM, total recoverable, pH 6.5-9.0 7429905	45.2		47.10					0.50	0.05		122.00	0.60	0.6	1	2.49		136
AMMONIA unionized -see seperate spreadsheets for FW criteria	16.0							0.50				0.60	0.6				136
ANTHRACENE 120127 3B		110000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
ANTIMONY (INORGANIC) 7440360 1M		4300	0.04	NO		NONE	NONE	0.50	0.72		7.50	0.60	0.6	9	0.73		136
ARSENIC (dissolved) 7440382 2M			0.04			0.0	0.0	0.50	0.72		7.50	0.60	0.6	9	0.73		136
ARSENIC (inorganic)		0.14						0.50				0.60	0.6				136
ASBESTOS 1332214								0.50				0.60	0.6				136
ATRAZINE								0.50				0.60	0.6				136
BACTERIA								0.50				0.60	0.6				136
BENZENE 71432 3V		71	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
BENZIDINE 92875 4B		0.00054	0.18	undetermined		0.1	0.1	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
BENZO(a)ANTHRACENE 56553 5B		0.031	0.04	undetermined		4.2	6.2	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
BENZO(a)PYRENE 50328 6B		0.031	0.04	undetermined		4.2	6.2	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
BENZO(b)FLUORANTHENE 205992 7B		0.031	0.04	undetermined		4.2	6.2	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
		0.031	0.04	undetermined		4.2	6.2	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
BERYLLIUM 7440417 3M								0.50				0.60	0.6				136
BHC - ALPHA 319846 2P		0.013						0.50				0.60	0.6				136
BHC - BETA 319857 3P		0.046						0.50				0.60	0.6				136
BHC - GAMMA 58899 4P (Lindane)		0.063						0.50				0.60	0.6				136
BHC - DELTA 319868 5P								0.50				0.60	0.6				136
BIS(2-CHLOROETHYL)ETHER 111444 11B		1.4	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
BIS(2 CHLOROISOPROPYL)ETHER 39638329 12B		170000						0.50				0.60	0.6				136
BIS(2-ETHYLHEXYL) PHTHALATE 117817 13B		5.9	0.92	NO		NONE	NONE	0.50	0.05	<	50.00	0.60	0.6	1	2.49		136
BROMOFORM 75252 5V		360	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
BUTYLBENZYL PHTHALATE 85687		1900	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
CADMIUM - 7440439 4M Hardness dependent	0.0590		0.06					0.50	0.61	<	0.10	0.60	0.6	6	0.86		136
Based on hardness in next column								0.50				0.60	0.6				136
CARBON TETRACHLORIDE 56235 6V		4.40	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
CHLOROBENZENE 108907 7V		21000	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
CHLORDANE 57749 6P		0.00059						0.50				0.60	0.6				136
CHLORODIBROMOMETHANE 124481 8V		34	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
CHLORIDE (dissolved) in mg/L 16887006								0.50				0.60	0.6				136
2-CHLORONAPTHALENE 91587 16B		1600.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
CHLORINE (Total Residual) 7782505			2.56			0.0	0.0	0.50	0.05		140.00	0.60	0.6	1	2.49		136
CHLOROETHYL ETHER (BIS - 2) 111444		1.40						0.50				0.60	0.6				136
CHLOROFORM 67663 11V		470	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
CHLOROISOPROPYL ETHER (BIS-2) 108601		170000						0.50				0.60	0.6				136
2-CHLOROPHENOL 95578 1A		150.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
4-CHLOROPHENOL 106489								0.50				0.60	0.6				136
CHLOROPHENOXY HERBICIDES(2,4-D) 94757								0.50				0.60	0.6				136
CHLORPYRIFOS 2921882								0.50				0.60	0.6				136
CHROMIUM(HEX) 18540299								0.50				0.60	0.6				136
CHROMIUM(TRI) -16065831 5M Hardness dependent								0.50				0.60	0.6				136
Based on hardness in next column								0.50				0.60	0.6				136
CHRYSENE 218019 18B		0.031	0.04	undetermined		4.2	6.2	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
COLOR								0.50				0.60	0.6				136
COPPER - 744058 6M Hardness dependent	0.6730		0.68					0.50	0.61		2.20	0.60	0.6	6	0.86		136

APPENDIX I - HUMAN HEALTH CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

HUMAN HEALTH CALCULATION NPDES PERMIT NO. WA-000295-0 OUTFALL 001 Parameter	Ambient Concentration (Geometric Mean) *ug/L*	Water Quality Criteria for Protection of Human Health *ug/L*	Max concentration at edge of chronic mixing zone. *ug/L*	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT *ug/L*	MAXIMUM DAILY EFFLUENT LIMIT *ug/L*	Estimated Percentile at 95% Confidence	*Pn*		Max effluent conc. measured *ug/L*	Coeff Variation *CV*	**S**	# of samples from which # in col. K was taken *n*	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
Based on hardness in next column								0.50				0.60	0.6				136
CYANIDE 57125 14M		220000	0.07	NO		NONE	NONE	0.50	0.74		14.00	0.60	0.6	10	0.70		136
DDT 50293 7P		0.00059						0.50				0.60	0.6				136
DDT METABOLITE (DDE) 72559 8P		0.00059						0.50				0.60	0.6				136
DDT METABOLITE (DDD) 72548 9P		0.00084						0.50				0.60	0.6				136
DIBENZO(a,h)ANTHRACENE 53703 19B		0.031	0.04	undetermined		4.2	6.2	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
DIBUTYLPHTHALATE 84742		12000						0.50				0.60	0.6				136
1,2 DICHLOROBENZENE 95501 20B		17000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
1,3 DICHLOROBENZENE 541731 21B		2600	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
1,4 DICHLOROBENZENE 106467 22B		2600	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
3,3 DICHLOROBENZIDINE 91941 23B		0.077	0.37	undetermined		10.5	15.3	0.50	0.05	<	20.00	0.60	0.6	1	2.49		136
DICHLOROBROMOMETHANE 75274 12V		22	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
1,2 DICHLOROETHANE 107062 15V		99	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
1,1 DICHLOROETHYLENE 75354 16V		3.20	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
2,3 DICHLOROPHENOL								0.50				0.60	0.6				136
2,4 DICHLOROPHENOL 120832 2A		790.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
2,5 DICHLOROPHENOL								0.50				0.60	0.6				136
2,6 DICHLOROPHENOL								0.50				0.60	0.6				136
1,2 DICHLOROPROPANE 78875		39.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
1,3 -DICHLOROPROPYLENE 542756 18V		1700	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
DIELDRIN 60571 10P		0.00014						0.50				0.60	0.6				136
DIETHYLPHTHALATE 84662 24B		120000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
2,4 DIMETHYLPHENOL 105679		850.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
DIMETHYLPHTHALATE 131113 25B		2900000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
DI-n-BUTYL PHTHALATE 84742 26B		12000	0.05	NO		NONE	NONE	0.50	0.05		3.00	0.60	0.6	1	2.49		136
2-METHYL-4,6 -DINITROPHENOL 534521 4A		765	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
2,4-DINITROPHENOL 51285 5A		14000	0.15	NO		NONE	NONE	0.50	0.47	<	20.00	0.60	0.6	4	1.04		136
DINITROTOLUENE 2,4 121142 27B		9.10	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
DINITROTOLUENE 2,6 606202 28B			0.09			0.0	0.0	0.50	0.05	<	5.00	0.60	0.6	1	2.49		136
DIOXIN (2,3,7,8-TCDD) 1746016		0.00000001		NO		NONE	NONE	0.50		<	0.00	0.60	0.6				136
1,2 DIPHENYLHYDRAZINE 122667 30B		0.54		NO		NONE	NONE	0.50		<	10.00	0.60	0.6	1			136
DI-2-ETHYLHEXYLPHTHALATE 117817								0.50				0.60	0.6				136
ENDOSULFAN a 959988 11P, b 33213659 12P		2.0						0.50				0.60	0.6				136
ENDOSULFAN SULFATE 1031078 13P		2.0						0.50				0.60	0.6		#NUM!		136
ENDRIN 72208 14P		0.81						0.50				0.60	0.6		#NUM!		136
ENDRIN ALDEHYDE 7421934 15P		0.81						0.50				0.60	0.6		#NUM!		136
ETHYLBENZENE 100414 19V		29000	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
FLUORANTHENE 206440 31B		370	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
FLUORENE 86737 32B		14000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
GASSES, TOTAL DISSOLVED				NO				0.50				0.60	0.6				136
HEPTACHLOR 76448 16P		0.00021						0.50				0.60	0.6		#NUM!		136
HEPTACHLOR EPOXIDE 1024573 17P		0.00011						0.50				0.60	0.6		#NUM!		136
HEXACHLOROBENZENE 118741 33B		0.00077	0.18	undetermined		0.1	0.2	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
HEXACHLOROBUTADIENE 87683 34B		50	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
HEXACHLOROCYCLOHEXANE-ALPHA 319846 2P		0.013						0.50				0.60	0.6				136
HEXACHLOROCYCLOHEXANE-BETA 319857 3P		0.046						0.50				0.60	0.6				136
HEXACHLOROCYCLOHEXANE-GAMMA (lindane) 58899 4P		0.063						0.50				0.60	0.6				136
HEXACHLOROCYCLOPENTADIENE 77474 35B		17000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
HEXACHLOROETHANE 67721 36B		8.90	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
INDENO(1,2,3-cd)PYRENE 193395 37B		0.031	0.04	undetermined		4.2	6.2	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
IRON 7439896				NO				0.50			505.00	0.60	0.6	1			136
ISOPHORONE 78591		600	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136

APPENDIX I - HUMAN HEALTH CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

HUMAN HEALTH CALCULATION NPDES PERMIT NO. WA-000295-0 OUTFALL 001 Parameter	Ambient Concentration (Geometric Mean) *ug/L*	Water Quality Criteria for Protection of Human Health *ug/L*	Max concentration at edge of chronic mixing zone. *ug/L*	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT *ug/L*	MAXIMUM DAILY EFFLUENT LIMIT *ug/L*	Estimated Percentile at 95% Confidence	*Pn*		Max effluent conc. measured *ug/L*	Coeff Variation *CV*	**S**	# of samples from which # in col. K was taken *n*	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
LEAD - 7439921 7M Dependent on hardness	0.1460		0.15					0.50	0.61	<	0.50	0.60	0.6	6	0.86		136
Based on hardness in next column [c]								0.50				0.60	0.6				136
MANGANESE 7439965		100.00		NO				0.50			187.00	0.60	0.6	1			136
2-METHYL-4-CHLOROPHENOL								0.50				0.60	0.6				136
3-METHYL-4-CHLOROPHENOL 59507				NO				0.50		<	2.00	0.60	0.6	1			136
3-METHYL-6-CHLOROPHENOL								0.50				0.60	0.6				136
METHYL BROMIDE 74839 20V		4000	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
METHYLENE CHLORIDE 75092 22V		1600	0.09	NO		NONE	NONE	0.50	0.05	<	5.00	0.60	0.6	1	2.49		136
MERCURY 7439976 8M	0.0010	0.15	0.00	NO		NONE	NONE	0.50	0.72	<	0.20	0.60	0.6	9	0.73		136
MONOCHLOROBENZENE 108907								0.50				0.60	0.6				136
NAPHTHALENE 91203 39B			0.04			0.0	0.0	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
NICKEL - 7440020 9M - Dependent on hardness		4600	0.45	NO		NONE	NONE	0.50	0.72		85.00	0.60	0.6	9	0.73		136
Based on hardness in next column				NO				0.50				0.60	0.6				136
NITROBENZENE 98953 40B		1900	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
2-NITROPHENOL 88755			0.09			0.0	0.0	0.50	0.05	<	5.00	0.60	0.6	1	2.49		136
NITRATE/NITRITE (N)			92.26			0.0	0.0	0.50	0.05		5040.00	0.60	0.6	1	2.49		136
NITROSAMINES		1.24						0.50				0.60	0.6				136
NITROSODIBUTYLAMINE N 924163		0.220						0.50				0.60	0.6				136
NITROSODIETHYLAMINE, N 55185		1.24						0.50				0.60	0.6				136
NITROSODIMETHYLAMINE N 62759 41B		8.10	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
N- NITROSODI-N-PROPYLAMINE 621647		0.51	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
NITROSODIPHENYLAMINE N 86306 43B		16		NO				0.50		<	2.00	0.60	0.6	1			136
NITROSOPYRROLIDINE, N 930552								0.50				0.60	0.6				136
OIL AND GREASE			15.92			0.0	0.0	0.50	0.99		8200.00	0.60	0.6	365	0.26		136
OXYGEN DISSOLVED 7782447								0.50				0.60	0.6				136
PARATHION 56382								0.50				0.60	0.6				136
PENTACHLOROBENZENE 608935		1.50						0.50				0.60	0.6				136
PENTACHLOROPHENOL 87865 8A (pH dependent in		8.20	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
fresh water) Enter pH in next cell>>>>>>>>								0.50				0.60	0.6				136
pH								0.50				0.60	0.6				136
PHENOL 108952 10A		4600000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
PHOSPHORUS-ELEMENTAL 7723140			11.42			0.0	0.0	0.50	0.05		624.00	0.60	0.6	1	2.49		136
Polychlorinated Biphenyls (PCB's) 53469219, 11097691, 1104282, 11141165,		0.000170						0.50				0.60	0.6				136
PYRENE 129000 45B		11000	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
SELENIUM 7782492 10M		4200.00	0.16	NO		NONE	NONE	0.50	0.61		25.10	0.60	0.6	6	0.86		136
SILVER - 7740224 11M dependent on hardness.			0.01			0.0	0.0	0.50	0.61		0.90	0.60	0.6	6	0.86		136
Based on hardness in next column								0.50				0.60	0.6				136
SOLIDS,DISSOLVED AND SALINITY								0.50				0.60	0.6				136
SOLIDS,SUSPENDED AND TURBIDITY								0.50				0.60	0.6				136
SULFIDE, HYDROGEN SULFIDE 7783064								0.50				0.60	0.6				136
TETRACHLOROETHANE 1,1,2,2 79345 23V		11.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
TETRACHLOROETHYLENE 127184 24V		8.85	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
TETRACHLOROPHENOL 2,3,4,6 95954								0.50				0.60	0.6				136
THALLIUM 7440280 12M		6.30	0.00	NO		NONE	NONE	0.50	0.72	<	0.50	0.60	0.6	9	0.73		136
TOLUENE 108883 25V		200000	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
TOXAPHENE 8001352 25P		0.00075						0.50				0.60	0.6				136
1,2-TRANS-DICHLOROETHYLENE 156605		140000	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
TRIBUTYLTIN (TBT)								0.50				0.60	0.6				136
TRICHLOROBENZENE 1,2,4 120821		940	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
TRICHLOROETHANE 1,1,1 71556 27V			0.04			0.0	0.0	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
TRICHLOROETHANE 1,1,2 79005 28V		42.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
TRICHLOROETHYLENE 79016 29V		81.00	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136

APPENDIX I - HUMAN HEALTH CRITERIA REASONABLE POTENTIAL TO EXCEED ANALYSIS

HUMAN HEALTH CALCULATION NPDES PERMIT NO. WA-000295-0 OUTFALL 001 Parameter	Ambient Concentration (Geometric Mean) *ug/L*	Water Quality Criteria for Protection of Human Health *ug/L*	Max concentration at edge of chronic mixing zone. *ug/L*	LIMIT REQ'D?	Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT *ug/L*	MAXIMUM DAILY EFFLUENT LIMIT *ug/L*	Estimated Percentile at 95% Confidence	*Pn*		Max effluent conc. measured *ug/L*	Coeff Variation *CV*	**S**	# of samples from which # in col. K was taken *n*	Multiplier	Calculated 50th percentile Effluent Conc. (When n>10)	Dilution Factor
TRICHLOROPHENOL 2,4,5 95954								0.50				0.60	0.6				136
TRICHLOROPHENOL 2,4,6 88062 11A		6.50	0.18	NO		NONE	NONE	0.50	0.05	<	10.00	0.60	0.6	1	2.49		136
VINYL CHLORIDE 75014 31V		525	0.04	NO		NONE	NONE	0.50	0.05	<	2.00	0.60	0.6	1	2.49		136
ZINC- 7440666 13M hardness dependent	3.9000		4.11					0.50	0.61		37.00	0.60	0.6	6	0.86		136
Note:																	
"undetermined" indicates many of these compounds were not measured at detectable levels. In those cases the detection limit was used as the maximum effluent concentration measured.																	
The method detection limit exceeds the water quality criteria																	

APPENDIX J - MIXING ZONE ANALYSIS DATA

Dilution Model Input Parameter - Outfall 001											
Model Input Parameter	**Units**	**Input**	**References**								
Number of Ports		13	From Table 2-1 in 2008 ENSR Mixing Zone Analysis Report.								
Port Diameter	m	0.0762	Same as above								
Port Spacing	m	1.219	Same as above								
Depth of Diffuser (MLLW)	m	17.37	Same as above								
Port Height	m	0.9144	Same as above								
Vertical Angle	Degree	-15	Same as above								
Horizontal Angle	Degree	90	Same as above								
Effluent Temperature (August average last 4 yrs from 2002-2005)	ºC	28.3	From Discharge Monitoring Reports								
Acute - Effluent flow (Highest Daily Max. Values) from Jan. 2007 through Oct. 2011	MGD	10.5	From Discharge Monitoring Reports, Table VI-1 in Permit Writer's Manual.								
Chronic (HH Non-carcinogen) - Effluent flow (Highest Monthly Average Values) from Jan. 2007 through Oct. 2011.	MGD	6.4	From Discharge Monitoring Reports, Table VI-1 in Permit Writer's Manual.								
Chronic (HH carcinogen) - Annual average effluent flow from Jan. 2007 through Oct. 2011	MGD	4.6	From Discharge Monitoring Reports, Table VI-1 in Permit Writer's Manual.								
Ambient Temperature @ 95th percentile	ºC	12.8	Long-term marine water quality data from GRG002 from 1989-2005.								
Ambient Current Velocity			From Appendix A, Effluent Plumes Modeling Study, August 2001, ENSR Consulting.								
For Acute (10th percentile)	m/s	0.05									
For Chronic (50th percentile)	m/s	0.19									
Dilution Factors											
Acute	31										
Chronic	110										
HH Carcinogen	136										
HH Non-Carcinogen	136										

Marine T-mix

T-Mix is based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance.

All Data inputs must meet WQ guidelines.
The Water Quality temperature guidance document may be found at: http://www.ecy.wa.gov/biblio/0610100.html

Notes:

INPUT	May-Sep	Oct-Apr
1. Chronic Dilution Factor at Mixing Zone Boundary	114	114
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	11.8 °C	11.8 °C
3. 1DADMax Effluent Temperature (95th percentile)	31.7 °C	25.6 °C
4. Aquatic Life Temperature WQ Criterion	13.0 °C	13.0 °C
OUTPUT		
5. Temperature at Chronic Mixing Zone Boundary:	11.97 °C	11.92 °C
6. Incremental Temperature Increase or decrease:	0.17 °C	0.12 °C
7. Incremental Temperature Increase 12/(T-2) if T≤ crit:	1.22 °C	1.22 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	13.00 °C	13.00 °C
A. If ambient temp is warmer than WQ criterion		
9. Does temp fall within this warmer temp range?	NO	NO
10. Temp increase allowed at mixing zone boundary, if required:	---	---
B. If ambient temp is cooler than WQ criterion but within 12/(T_{amb}-2) and within 0.3 °C of the criterion		
11. Does temp fall within this incremental temp. range?	NO	NO
12. Temp increase allowed at mixing zone boundary, if required:	---	---
C. If ambient temp is cooler than (WQ criterion-0.3) but within 12/(T_{amb}-2) of the criterion		
13. Does temp fall within this Incremental temp. range?	YES	YES
14. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT	NO LIMIT
D. If ambient temp is cooler than (WQ criterion - 12/(T_{amb}-2))		
15. Does temp fall within this Incremental temp. range?	NO	NO
16. Temp increase allowed at mixing zone boundary, if required:	---	---
17. Do any of the above cells show a temp increase?	**NO**	**NO**
18. Temperature Limit if Required?	**NO LIMIT**	**NO LIMIT**

				Wet Season		Dry Season	
Month	**Max Effluent Temp.**			**Oct-April**		**May-Sept**	
Feb-00	70			70		82	
Mar-00	69			69		94	
Apr-00	78			78		84	
May-00	82			77		84	
Jun-00	94			68		79	
Jul-00	84			66		81	
Aug-00	84			68		81	
Sep-00	79			70		83	
Oct-00	77			73		85	
Nov-00	68			77		80	
Dec-00	66			74		77	
Jan-01	68			68		83	
Feb-01	70			63		86	
Mar-01	73			66		84	
Apr-01	77			67		80	
May-01	81			72		79	
Jun-01	81			74		84	
Jul-01	83			74		89	
Aug-01	85			72		82	
Sep-01	80			71		81	
Oct-01	74			71		81	
Nov-01	68			72		83	
Dec-01	63			73		86	
Jan-02	66			75		84	
Feb-02	67			76		79	
Mar-02	72			69		84	
Apr-02	74			67		82	
May-02	77			68		85	
Jun-02	83			69		85	
Jul-02	86			72		77	
Aug-02	84			79		82	
Sep-02	80			77		86	
Oct-02	74			72		89	
Nov-02	72			69		84	
Dec-02	71			71		83	
Jan-03	71			71		84	
Feb-03	72			74		85	
Mar-03	73			80		88	
Apr-03	75			74		86	
May-03	79			68		83	
Jun-03	84			68		81	
Jul-03	89			67		85	
Aug-03	82			69		83	
Sep-03	81			74		83	
Oct-03	76			78		82	
Nov-03	69			76		82	
Dec-03	67			70		86	
Jan-04	68			68		90	
Feb-04	69			68		86	
Mar-04	72			72		80	
Apr-04	79			74		78	
May-04	81			77		80	
Jun-04	83			75		86	

Jul-04	86			72		87	
Aug-04	84			67		79	
Sep-04	79			67			
Oct-04	77			73			
Nov-04	72			71			
Dec-04	69			75			
Jan-05	71			76			
Feb-05	71			72			
Mar-05	74			71			
Apr-05	80			70			
May-05	84			72			
Jun-05	82			72			
Jul-05	85			78			
Aug-05	85			75			
Sep-05	77			70			
Oct-05	74			67			
Nov-05	68			68			
Dec-05	68			69			
Jan-06	67			72			
Feb-06	69			75			
Mar-06	74			77			
Apr-06	78			74			
May-06	82			71			
Jun-06	86						
Jul-06	89		95th percentile	78	25.6 ºC	89	31.7 ^{0}C
Aug-06	84						
Sep-06	83						
Oct-06	76						
Nov-06	70						
Dec-06	68						
Jan-07	68						
Feb-07	72						
Mar-07	74						
Apr-07	77						
May-07	84						
Jun-07	85						
Jul-07	88						
Aug-07	86						
Sep-07	83						
Oct-07	75						
Nov-07	72						
Dec-07	67						
Jan-08	67						
Feb-08	73						
Mar-08	71						
Apr-08	75						
May-08	81						
Jun-08	85						
Jul-08	83						
Aug-08	83						
Sep-08	82						
Oct-08	76						
Nov-08	72						
Dec-08	71						
Jan-09	70						

Feb-09	72						
Mar-09	72						
Apr-09	78						
May-09	82						
Jun-09	86						
Jul-09	90						
Aug-09	86						
Sep-09	80						
Oct-09	75						
Nov-09	70						
Dec-09	67						
Jan-10	68						
Feb-10	69						
Mar-10	72						
Apr-10	75						
May-10	78						
Jun-10	80						
Jul-10	86						
Aug-10	87						
Sep-10	79						
Oct-10	77						
Nov-10	74						
Dec-10	71						

BP Cherry Point Acute WET Test Results as % Survival in 100% Effluent							
Sample Date	Start Date	Lab	Organism	Endpoint	% Survival		
3/6/2000	3/6/2000	EVS	*Daphnia magna*	48-hour Survival	100.0%		
4/4/2000	4/5/2000	ENSR	fathead minnow	96-hour Survival	82.5%		
4/4/2000	4/5/2000	ENSR	fathead minnow	96-hour Survival	82.5%		
7/18/2000	7/19/2000	ENSR	*Daphnia magna*	48-hour Survival	90.0%		
11/28/2000	11/29/2000	ENSR	fathead minnow	96-hour Survival	60.0%		
1/23/2001	1/24/2001	ENSR	*Daphnia magna*	48-hour Survival	100.0%		
5/21/2001	5/22/2001	ENSR	fathead minnow	96-hour Survival	77.5%		
9/18/2001	9/19/2001	ENSR	*Daphnia magna*	48-hour Survival	60.0%		
11/28/2001	11/29/2001	ENSR	fathead minnow	96-hour Survival	27.5%		
3/13/2002	3/14/2002	ENSR	*Daphnia magna*	48-hour Survival	85.0%		
5/1/2002	5/2/2002	ENSR	fathead minnow	96-hour Survival	57.5%		
9/17/2002	9/18/2002	ENSR	*Daphnia magna*	48-hour Survival	0.0%		
11/20/2002	11/21/2002	ENSR	fathead minnow	96-hour Survival	87.5%		
3/17/2003	3/18/2003	ENSR	*Daphnia magna*	48-hour Survival	100.0%		
5/12/2003	5/13/2003	ENSR	fathead minnow	96-hour Survival	67.5%		
9/23/2003	9/24/2003	ENSR	*Daphnia magna*	48-hour Survival	75.0%		
11/18/2003	11/19/2003	ENSR	fathead minnow	96-hour Survival	97.5%		
2/17/2004	2/18/2004	ENSR	*Daphnia magna*	48-hour Survival	95.0%		
6/14/2004	6/15/2004	ENSR	fathead minnow	96-hour Survival	0.0%		
8/31/2004	9/1/2004	ENSR	*Daphnia magna*	48-hour Survival	100.0%		
12/1/2004	12/2/2004	ENSR	fathead minnow	96-hour Survival	7.5%		
3/1/2005	3/2/2005	ENSR	*Daphnia magna*	48-hour Survival	95.0%		
6/7/2005	6/8/2005	ENSR	fathead minnow	96-hour Survival	90.0%		
8/24/2005	8/25/2005	ENSR	*Daphnia magna*	48-hour Survival	80.0%		
10/24/2005	10/25/2005	ENSR	fathead minnow	96-hour Survival	95.0%		
2/28/2006	3/1/2006	ENSR	*Daphnia magna*	48-hour Survival	95.0%		
6/21/2006	6/22/2006	ENSR	fathead minnow	96-hour Survival	22.5%		
8/23/2006	8/24/2006	ENSR	*Daphnia magna*	48-hour Survival	95.0%		
12/5/2006	12/6/2006	ENSR	fathead minnow	96-hour Survival	92.5%		
1/30/2007	1/31/2007	Nautilus	fathead minnow	96-hour Survival	22.5%		
1/30/2007	1/31/2007	Nautilus	topsmelt	96-hour Survival	53.3%		
2/6/2007	2/7/2007	ENSR	*Daphnia magna*	48-hour Survival	100.0%		
6/11/2007	6/12/2007	Nautilus	topsmelt	96-hour Survival	20.0%		
6/11/2007	6/12/2007	Nautilus	fathead minnow	96-hour Survival	0.0%		
6/12/2007	6/13/2007	ENSR	fathead minnow	96-hour Survival	20.0%		
8/7/2007	8/8/2007	ENSR	*Daphnia magna*	48-hour Survival	95.0%		
12/18/2007	12/19/2007	ENSR	fathead minnow	96-hour Survival	67.5%		
2/12/2008	2/13/2008	ENSR	*Daphnia magna*	48-hour Survival	90.0%		
4/1/2008	4/2/2008	CO	fathead minnow	96-hour Survival	97.5%		
4/1/2008	4/2/2008	Nautilus	topsmelt	96-hour Survival	65.0%		
4/1/2008	4/2/2008	Nautilus	fathead minnow	96-hour Survival	85.0%		
5/21/2008	5/22/2008	Nautilus	fathead minnow	96-hour Survival	95.0%		
5/21/2008	5/22/2008	Nautilus	topsmelt	96-hour Survival	60.0%		
11/18/2008	11/19/2008	CO	fathead minnow	96-hour Survival	80.0%		
2/27/2009	2/28/2009	Nautilus	topsmelt	96-hour Survival	100.0%		
2/27/2009	2/28/2009	Nautilus	fathead minnow	96-hour Survival	100.0%		
4/9/2009	4/10/2009	CO	fathead minnow	96-hour Survival	95.0%		
10/27/2009	10/28/2009	CO	fathead minnow	96-hour Survival	100.0%		
7/21/2009	7/22/2009		Daphnia magna	48-hour Survival	100.0%		
4/6/2010	4/7/2010	Nautilus	fathead minnow	96-hour Survival	55.0%		
4/6/2010	4/7/2010	Nautilus	topsmelt	96-hour Survival	20.0%		
5/26/2010	5/26/2010	CO	fathead minnow	96-hour Survival	97.5%		
6/29/2010	6/30/2010	Nautilus	topsmelt	96-hour Survival	50.0%		
6/29/2010	6/30/2010	Nautilus	fathead minnow	96-hour Survival	70.0%		

7/13/2010	7/14/2010		Daphnia magna	48-hour Survival	85.0%		

BP Cherry Point Acute WET Test Results as NOEC/LOEC in % Effluent

Sample Date	Start Date	Lab	Organism	Endpoint	NOEC	LOEC	MSDp
3/6/2000	3/6/2000	EVS	*Daphnia magna*	48-hour Survival	100	> 100	
4/4/2000	4/5/2000	ENSR	fathead minnow	96-hour Survival	100	> 100	4.56%
4/4/2000	4/5/2000	ENSR	fathead minnow	96-hour Survival	100	> 100	4.56%
7/18/2000	7/19/2000	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	9.12%
11/28/2000	11/29/2000	ENSR	fathead minnow	96-hour Survival	50	100	12.65%
11/28/2000	11/29/2000	ENSR	fathead minnow	96-hour Survival	50	100	12.65%
1/23/2001	1/24/2001	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	
5/21/2001	5/22/2001	ENSR	fathead minnow	96-hour Survival	100	> 100	8.42%
9/18/2001	9/19/2001	ENSR	*Daphnia magna*	48-hour Survival	50	100	20.75%
11/28/2001	11/29/2001	ENSR	fathead minnow	96-hour Survival	50	100	4.51%
3/13/2002	3/14/2002	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	8.69%
5/1/2002	5/2/2002	ENSR	fathead minnow	96-hour Survival	25	50	9.41%
9/17/2002	9/18/2002	ENSR	*Daphnia magna*	48-hour Survival	50	100	5.72%
11/20/2002	11/21/2002	ENSR	fathead minnow	96-hour Survival	100	> 100	4.85%
3/17/2003	3/18/2003	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	4.21%
5/12/2003	5/13/2003	ENSR	fathead minnow	96-hour Survival	50	100	15.91%
9/23/2003	9/24/2003	ENSR	*Daphnia magna*	48-hour Survival	50	100	6.03%
11/18/2003	11/19/2003	ENSR	fathead minnow	96-hour Survival	100	> 100	12.28%
2/17/2004	2/18/2004	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	4.21%
6/14/2004	6/15/2004	ENSR	fathead minnow	96-hour Survival	50	100	35.56%
8/31/2004	9/1/2004	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	8.35%
12/1/2004	12/2/2004	ENSR	fathead minnow	96-hour Survival	12.5	25	22.56%
3/1/2005	3/2/2005	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	9.20%
6/7/2005	6/8/2005	ENSR	fathead minnow	96-hour Survival	50	100	9.80%
8/24/2005	8/25/2005	ENSR	*Daphnia magna*	48-hour Survival	50	100	5.00%
10/24/2005	10/25/2005	ENSR	fathead minnow	96-hour Survival	100	> 100	7.58%
2/28/2006	3/1/2006	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	9.20%
6/21/2006	6/22/2006	ENSR	fathead minnow	96-hour Survival	50	100	5.83%
8/23/2006	8/24/2006	ENSR	*Daphnia magna*	48-hour Survival	100	100	11.28%
12/5/2006	12/6/2006	ENSR	fathead minnow	96-hour Survival	100	100	4.57%
1/30/2007	1/31/2007	Nautilus	fathead minnow	96-hour Survival	50	100	12.31%
1/30/2007	1/31/2007	Nautilus	topsmelt	96-hour Survival	3.6	100	17.78%
1/30/2007	1/31/2007	Nautilus	Pacific herring	96-hour Survival	100	> 100	6.72%
2/6/2007	2/7/2007	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	9.20%
6/11/2007	6/12/2007	Nautilus	Pacific herring	96-hour Survival	50	100	13.34%
6/11/2007	6/12/2007	Nautilus	topsmelt	96-hour Survival	50	100	22.74%
6/11/2007	6/12/2007	Nautilus	fathead minnow	96-hour Survival	50	100	20.25%
6/12/2007	6/13/2007	ENSR	fathead minnow	96-hour Survival	50	100	10.22%
8/7/2007	8/8/2007	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	9.20%
12/18/2007	12/19/2007	ENSR	fathead minnow	96-hour Survival	50	100	5.29%
2/12/2008	2/13/2008	ENSR	*Daphnia magna*	48-hour Survival	100	> 100	9.96%
4/1/2008	4/2/2008	Nautilus	topsmelt	96-hour Survival	50	100	17.73%
4/1/2008	4/2/2008	CO	fathead minnow	96-hour Survival	100	100	4.57%
4/1/2008	4/2/2008	Nautilus	fathead minnow	96-hour Survival	100	100	11.93%
5/21/2008	5/22/2008	Nautilus	topsmelt	96-hour Survival	100	100	22.56%
5/21/2008	5/22/2008	Nautilus	fathead minnow	96-hour Survival	100	100	10.09%
5/21/2008	5/22/2008	Nautilus	Pacific herring	96-hour Survival	100	100	40.08%
11/18/2008	11/19/2008	CO	fathead minnow	96-hour Survival	50	100	6.98%
1/27/2009	1/28/2009	CO	Daphnia magna	48-hour Survival	100	100	16.87%
2/27/2009	2/28/2009	Nautilus	fathead minnow	96-hour Survival	100	100	5.90%
2/27/2009	2/28/2009	Nautilus	topsmelt	96-hour Survival	100	100	5.00%
2/27/2009	2/28/2009	Nautilus	Pacific herring	96-hour Survival	100	100	6.70%

3/26/2009	3/27/2009	Nautilus	Pacific herring	96-hour Survival	50	100	11.64%
4/9/2009	4/10/2009	CO	fathead minnow	96-hour Survival	100	100	4.94%
7/21/2009	7/22/2009	CO	Daphnia magna	48-hour Survival	100	100	9.20%
10/27/2009	10/28/2009	CO	fathead minnow	96-hour Survival	100	100	2.50%
1/26/2010	1/27/2010	CO	Daphnia magna	48-hour Survival	100	100	9.20%
4/6/2010	4/7/2010	Nautilus	fathead minnow	96-hour Survival	50	100	14.96%
4/6/2010	4/7/2010	Nautilus	topsmelt	96-hour Survival	12.5	25	27.01%
4/6/2010	4/7/2010	Nautilus	Pacific herring	96-hour Survival	50	100	18.81%
5/26/2010	5/26/2010	CO	fathead minnow	96-hour Survival	100	100	5.51%
6/29/2010	6/30/2010	Nautilus	fathead minnow	96-hour Survival	50	100	12.19%
6/29/2010	6/30/2010	Nautilus	topsmelt	96-hour Survival	50	100	22.94%
7/13/2010	7/14/2010	CO	Daphnia magna	48-hour Survival	100	100	13.68%

BP Cherry Point Chronic WET Test Results as NOEC/LOEC in % Effluent

Sample Date	Start Date	Lab	Organism	Endpoint	NOEC	LOEC	MSDp
3/13/2002	3/13/2002	EVS	blue mussel	Proportion Normal	35.8	71.6	0.80%
				Survival	35.8	71.6	3.26%
3/13/2002	3/14/2002	EVS	topsmelt	7-day Survival	71.4	> 71.4	10.63%
				Biomass	71.4	> 71.4	10.94%
				Weight	71.4	> 71.4	13.43%
6/21/2002	6/21/2002	EVS	blue mussel	Proportion Normal	3.6	8.9	0.90%
				Survival	8.9	17.8	2.32%
6/21/2002	6/22/2002	EVS	topsmelt	7-day Survival	69.8	> 69.8	12.45%
				Biomass	69.8	> 69.8	19.18%
				Weight	69.8	> 69.8	19.41%
9/12/2002	9/13/2002	EVS	topsmelt	7-day Survival	38.5	76.9	8.49%
				Biomass	38.5	76.9	18.75%
				Weight	76.9	> 76.9	20.34%
9/16/2002	9/17/2002	EVS	blue mussel	Proportion Normal	3.6	9	1.74%
				Survival	36.1	72.2	8.79%
11/20/2002	11/20/2002	EVS	topsmelt	7-day Survival	69.1	> 69.1	11.31%
				Biomass	69.1	> 69.1	20.22%
				Weight	69.1	> 69.1	20.41%
11/20/2002	11/20/2002	EVS	blue mussel	Proportion Normal	68.3	> 68.3	1.63%
				Survival	68.3	> 68.3	4.99%

BP Cherry Point Herring Test Results

Sample Date	Testing Date	Lab	Organism	Endpoint	NOEC	LOEC	
1/30/2007	1/31/2007	Nautilus	Pacific herring	96-hr Survival Rate	100	>100	
6/11/2007	6/12/2007	Nautilus	Pacific herring	96-hr Survival Rate	50	100	
5/21/2008	5/22/2008	Nautilus	Pacific herring	96-hr Survival Rate	100	100	
2/27/2009	2/28/2009	Nautilus	Pacific herring	96-hr Survival Rate	100	100	
3/26/2009	3/27/2009	Nautilus	Pacific herring	96-hr Survival Rate	50	100	
4/6/2010	4/7/2010	Nautilus	Pacific herring	96-hr Survival Rate	50	100	

APPENDIX M: GROUNDWATER MONITORING RESULTS

BASIN WATER RESULTS

First Round - May 2003	**Units**	Groundwater Quality Standards	MTCA Groundwater Criteria	Stormwater Pond	Clarification Pond
Iron	mg/l	0.3	NV	<0.300	0.674
Arsenic	mg/l	0.00005	0.005	<0.00100	0.0253
Manganese	mg/l	0.05	2.24	0.0636	0.116
Sulfate	mg/l	250	NV	24.3	4350
Total Dissolved Solids	mg/l	500	NV	110	6800
Second Round - August 2003					
Iron	mg/l	0.3	NV	<0.300	1.08
Arsenic	mg/l	0.00005	0.005	<0.00100	0.025
Manganese	mg/l	0.05	2.24	0.0186	0.1
Sulfate	mg/l	250	NV	15.3	4160
Total Dissolved Solids	mg/l	500	NV	69	6800
Notes:					
NV: no value					
None of the volatile and semi-volatile organic compound concentrations were detected at their respective method					
reporting limits in either of the basin water samples.					

APPENDIX M - GROUNDWATER MONITORING RESULTS

GROUNDWATER RESULTS							
First Round - May 2003	Units	GWQS	MTCA GW Criteria	MW-109 (up gradient)	MW-110 (cross gradient)	MW-111 (down gradient)	Duplicate of MW-111
Iron	mg/l	0.3	NV	1.1	<0.300	1.41	1.66
Arsenic	mg/l	0.00005	0.005	<0.00100	0.00317	<0.00100	<0.00100
Manganese	mg/l	0.05	2.24	0.0694	0.0683	0.282	0.288
Chloride	mg/l	250	NV	19.8	16.7	563	549
Sulfate	mg/l	250	NV	32.5	14.9	731	726
Total Dissolved Solids	mg/l	500	NV	280	270	2500	2600
Second Round - August 2003							
Iron	mg/l	0.3	NV	0.707	<0.300	2.08	1.93
Arsenic	mg/l	0.00005	0.005	0.00108	0.0031	0.00111	<0.00100
Manganese	mg/l	0.05	2.24	0.0505	0.242	0.876	0.964
Chloride	mg/l	250	NV	21.6	17.7	463	476
Sulfate	mg/l	250	NV	33	17	528	523
Total Dissolved Solids	mg/l	500	NV	300	280	2200	2300
Third Round - November 2003							
Iron	mg/l	0.3	NV	0.37	0.38	1.68	1.61
Arsenic	mg/l	0.00005	0.005	<0.00100	0.0036	<0.00100	<0.00100
Manganese	mg/l	0.05	2.24	0.0217	0.294	0.341	0.315
Chloride	mg/l	250	NV	24.9	17.9	446	448
Sulfate	mg/l	250	NV	31.8	11.6	571	576
Total Dissolved Solids	mg/l	500	NV	290	250	2100	2100
Fourth Round - February 2004							
Iron	mg/l	0.3	NV	0.5	<0.300	1.33	1.28
Arsenic	mg/l	0.00005	0.005	0.00122	0.00374	<0.00100	<0.00100
Manganese	mg/l	0.05	2.24	0.0403	0.207	0.19	0.172
Chloride	mg/l	250	NV	23	17.1	511	503
Sulfate	mg/l	250	NV	30.8	11.7	653	659
Total Dissolved Solids	mg/l	500	NV	300	280	2500	2500
Notes:							
NV: no value							
All of the volatile and semi-volatile organic compound concentrations were either not detected at their respective method							
reporting limits or considered undetected based on data validation (bis(2-ethylhexyl)phthalate only).							

NPDES Permit
No. WA-002290-0

APPENDIX N - PERFORMANCE-BASED REDUCTION OF MONITORING FREQUENCY

OUTFALL 001	**BOD**	**TSS**	**Ammonia as N**	**Sulfide**	**Oil & Grease**	**Phenolics**	**COD**
Units	**lb/day**	**lb/day**	**lb/day**	**lb/day**	**lb/day**	**lb/day**	**lb/day**
Monthly Average permit limit in current permit	1240	990	870	6.7	360	8.1	8540
Daily maximum permit limit in current permit	2260	1570	1910	14.7	680	16.7	16610
Long-term average values*	207	541	81	0.8	51	2.3	2844
Long-term average / monthly average permit limit (% basis)	17%	55%	9%	12%	14%	28%	33%
Maximum of the monthly averages	431	871	214	1.6	117	3.2	4628
Maximum daily values (from DMRs)	1637	2985**	1146	6.6	470	10.1	11518
Current permit monitoring frequency	1/7	7/7	5/7	1/mo	7/7	1/7	7/7
Policy monitoring recommendations	2/mo	4/7	1/7	1/6 mos	3/7	1/2 mos	3/7
Proposed permit monitoring frequency	**1/7**	**7/7**	**3/7**	**1/mo**	**7/7**	**1/7**	**3/7**
*The Long-term Ave values reflect the data from January 2009 and December 2009.							
**Limit allowed w/ stormwater allocation is 3099 lb/day (12/3/2007).							